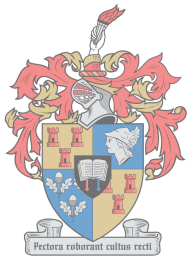
Assessing the nutrition situation in early childhood development centres in Zandspruit and Orange Farm, Gauteng Province, South Africa

by
James Majaha



Thesis presented in partial fulfilment of the requirements for the degree Master of Nutrition at the University of Stellenbosch

Supervisor: Mrs HE Koornhof
Co-supervisor: Mr G Tshitaudzi
Statistician: Mr J Kutyauripo

Faculty of Medicine and Health Sciences
Department of Global Health
Division of Human Nutrition

March 2018

DECLARATION

By submitting this thesis/dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

James Majaha

23 February 2018

Assessing nutrition situation in early childhood development centres in Zandspruit and Orange Farm, Gauteng Province, South Africa

Abstract

Nutrition plays a pivotal role in early childhood development (ECD). The knowledge and practices of practitioners, impact dietary habits and childcare practices at ECD centres and this could cause higher incidences and prevalence of undernutrition, overnutrition, and micronutrient deficiencies. This study focused on the knowledge and practices of ECD practitioners in Orange Farm and Zandspruit.

Objectives: To assess the nutrition knowledge and practices of practitioners and describe the anthropometric status of children, 6-59 months old, attending ECD centres.

Design: Descriptive and analytical, cross-sectional study.

Subjects and Setting: Practitioners were interviewed at 136 randomly selected ECD centres in Orange Farm (n=120) and Zandspruit (n=16), Gauteng Province. Anthropometry was performed on children in 15 ECD centres.

Methods: Quantitative data collection included interviews with practitioners using an in-depth questionnaire and dietary diversity (DD) tool. Anthropometric measurements were performed on children. Focus group discussions were conducted to obtain qualitative data.

Results: The response rate for Zandspruit was 87.6 % (n=14) and 95.8 % (n=115) for Orange Farm. Prevalence of global acute malnutrition (GAM) was 0.7% (n=3) and GAM by mid-upper arm circumference (MUAC) 0.2% (n=1), with underweight at 8.9% (n=32), overweight at 4.9% (n=21) and 1.2% (n=5) for obesity. Stunting prevalence was 26.7% (n=96), which is similar to the South African national level. Weight-for-age z-scores (WAZ) and weight-for-height z-scores (WHZ) were similar in the two study areas. Only MUAC was significantly lower in Zandspruit compared to Orange Farm (p=0.03). Zandspruit ECD centres charged higher school fees for all age groups when compared to Orange Farm, p<0.0001. There was a significant difference in knowledge of defining the term “balanced diet”, where ECD centres in Orange Farm scored higher compared to Zandspruit (p=0.003). All participants scored poorly on knowledge on anaemia (21.1%, n=26), exclusive breastfeeding (47.2%, n=58) and malnutrition (48.8%, n=60). Inappropriate food preparation methods were noted; 96.7% (n=119) of the ECD centres used improper traditional cooking methods for meat (chicken/beef) and vegetables that included long cooking time, boiling and draining away

water before adding oil and other ingredients. ECD centres in Zandspruit provided more diversified diets, in comparison with centres in Orange Farm; the mean DD score was 4.83 (SD=1.030) and 4.67 (SD=1.223) respectively. Sanitation and refuse disposal were significantly poorer in Zandspruit, $p=0.014$ and $p<0.0001$ respectively.

Conclusion: Based on these findings, similar to available global evidence, it is evident that severe acute malnutrition (wasting) is not a crisis in the country but endemic stunting is a critical problem that requires urgent attention. Stunting in South Africa is a complex phenomenon and communities need a holistic approach to identify the drivers of this condition. Intervention to improve the nutrition knowledge and practices of ECD practitioners is necessary as they can play a role in worsening nutrition situation of children in ECD centres. ECD centres in their own capacities are unable to address the burden of malnutrition. Parents, Department of Social Development and Department of Health need to strengthen and accelerate implementation of ECD policies, change behaviours and continue creating supportive environments to improve the nutritional profile of ECD centres.

Assessering van die voedingsituasie in vroeë kinderontwikkeling sentrums in Zandspruit en Orange Farm, Gauteng Provinsie, Suid-Afrika

Opsomming:

Voeding speel 'n sentrale rol in vroeë kinderontwikkeling. Die praktisyns se kennis en praktyke beïnvloed dieetgewoontes en kindersorgpraktyke by Vroeë Kinderontwikkeling (VKO) sentrums en dit kan lei tot 'n hoër voorkoms van ondervoeding, oorvoeding en mikronutriënttekorte. Die studie fokus op voedingkennis en praktyke van VKO-praktisyns in Orange Farm en Zandspruit nedersettings.

Doelwitte: Om voedingkennis en praktyke van praktisyns werksaam by VKO-sentrums te bepaal. Die antropometriese status van kinders, 6-59 maande oud, by VKO-sentrums word ook beskryf.

Ontwerp: 'n Beskrywende, analitiese deursnitstudie

Deeelnemers en omgewing: Praktisyns by 136 willekeurig gekose VKO-sentrums in Orange Farm (n = 120) en Zandspruit (n = 16), Gauteng Provinsie. Antropometriese metings was by 15 VKO-sentrums op die kinders gedoen.

Metodes: Kwantitatiewe data-insameling het ingesluit beide onderhoude met praktisyns, met behulp van ‘n diepgaande vraelys en die dietdiversiteit-instrument. Antropometriese metings is gedoen op kinders. Kwalitatiewe data is met behulp van fokusgroepbesprekings ingesamel.

Resultate: Deelname-koers vir Zandspruit was 87,6% (n = 14) en 95,8% (n = 115) in Orange Farm. Die voorkoms van wêreldwye akute wanvoeding (*GAM*) was 0,7% (n = 3) en *GAM* deur middel van bo-arm omtrek (*MUAC*) 0.2% (n = 1), met ondergewig teen 8,9% (n = 32), oorgewig op 4,9 % (n =21) en 1.2% (n = 5) vetsug. Voorkoms van dwerggroei was 26,7% (n = 96), wat soortgelyk is aan die Suid-Afrikaanse nasionale vlak. Gewig-vir-ouderdom z-tellings (*WAZ*) en gewig-vir-lengte-z-tellings (*WHZ*) was soortgelyk in die 2 studiegebiede. Slegs *MUAC* in Zandspruit was aansienlik laer as Orange Farm (p = 0.03). Zandspruit-VKO-sentrums se skoolgeld is hoër vir al hul ouderdomsgroepe in vergelyking met Orange Farm, p <0.0001. Daar was 'n wesenlike verskil in kennis om die term "gebalanseerde dieet" te definieer, waar VKO-sentrums in Orange Farm hoër geslaag het in vergelyking met Zandspruit (p = 0.003). Al die deelnemers het egter swak getuig van kennis oor anemie (21.1%, n = 26), eksklusiewe borsvoeding (47.2%, n = 58) en wanvoeding (48.8%, n = 60). Onvanpaste voedselvoorbereidingsmetodes is aangeteken. 96,7% (n = 119) van die VKO-sentrums gebruik onvanpaste tradisionele kookmetodes vir vleis (hoender/beesvleis) en groente wat lang

kooktyd ingesluit het, kook en afvoer van water voordat olie en ander bestanddele bygevoeg word. VKO-sentrums in Zandspruit het meer gediversifiseerde diëte voorsien in vergelyking met sentrums in Orange Farm; die gemiddelde dieetdiversiteittelling was onderskeidelik 4.83 (SD = 1.030) en 4.67 (SD = 1.223). Sanitasie en vullisverwydering was aansienlik swakker in Zandspruit, p = 0,014 en p <0,0001 onderskeidelik.

Gevolgtrekking: Op grond van hierdie bevindinge, soortgelyk aan beskikbare globale bewyse, is dit duidelik dat ernstige akute wanvoeding (uittering) nie 'n krisis in die land is nie, maar endemiese dwerggroeie is 'n kritiese probleem wat dringende aandag vereis. Dwerggroei in Suid-Afrika is 'n komplekse verskynsel en gemeenskappe het 'n holistiese benadering nodig om die bestuurders van hierdie toestand te identifiseer. Intervensie om die voedingskennis en praktyke van VKO-praktisyns te verbeter, is noodsaaklik aangesien hulle 'n rol kan speel in die verslegtende voedingsituasie van kinders in VKO-sentrums. VKO-sentrums in hul eie vermoëns kan nie die las van wanvoeding aanspreek nie. Ouers, Departement van Maatskaplike Ontwikkeling en die Departement van Gesondheid moet die implementering van VKO-beleid versterk en versnel, gedrag verander en voortgaan met die skep van ondersteunende omgewings om die voedingsprofiel van VKO-sentrums te verbeter.

Acknowledgements

I would like to express my sincere gratitude to my Supervisor (Mrs Liesbet Koornhof) and Co-supervisor (Mr Gilbert Tshitaudzi) for their patience, mentorship, support and guidance throughout all these years. It has not been as easy as I thought it would be but, Ebenezer, God is faithful, to Him, I give all the glory and honour. My heartfelt gratitude goes to my family Olinda, Princess and Prince to whom I also dedicate this research. Special thanks go to the Department of Social Development, Gauteng for approving the research to be conducted in their province and ECD centres, Leizl Eylkhof (language editor) and the data collection team for the job well done and not forgetting to mention colleagues abroad Jaison Chireshe (South Sudan) and Josphat Kutyauripo, Zephenia Gomora (Zimbabwe) for remote assistance in statistical analysis.

CONTENTS

List of Tables

List of Figures

List of Boxes

ACRONYMS

ARI	Acute Respiratory Infection
BAZ	BMI for age Z score
BMI	Body Mass Index
CGECCD	Consultative Group on Early Childhood Care and Development
CI	Confidence Interval
CoMMiC	Committee on Morbidity and Mortality in Children
CSIs	Corporate Social Investors
DDS	Dietary diversity scores
DEFF	Design effect
DoH	Department of Health
DSD	Department of Social Development
ECD	Early childhood development
ECDs	Early childhood development centres
FAO	Food and Agriculture Organization
ENA	Emergency Nutrition Assessment
GAM	Global acute malnutrition
HAZ	Height-for-Age Z score
ID	Index of Dispersion
IEC	Information education and communication
KABP	Knowledge, attitude, behaviour and practice
KPC	Knowledge, practice and coverage
MUAC	Mid-Upper Arm Circumference
NGO	Non-Governmental Organizations
NFCS	National Food Consumption Survey
NPO	Not for Profit Organizations
NQFL	National Qualifications Framework Level
PDF	Portable Document Format

RDP	Reconstruction and Development Programme
UN	United Nations
WASH	Water, sanitation and hygiene
WAZ	Weight-for-age Z score
WHO	World Health Organization
WHZ	Weight-for-height Z score
SDG	Sustainable Development Goal
SADHS	South Africa Demographic and Health Survey
SAM	Severe acute malnutrition
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology

BOX 1: Key terms as it is used in this Thesis

Design effect (DEFF): A correlation factor used to determine sample sizes in clusters based on the perceived variation between the clusters. Smaller values between the clusters mean better reliability of the results and less variation. If the expected prevalence of global acute malnutrition, stunting or underweight is high > 20%, DEFF can be increased from a minimum value of 1 to 1.5/1.8.[1]

Dietary diversity score (DDS): Indicator for measuring household access to a wide variety of foods grouped in specific food groups and a proxy measure to ascertain nutrient adequacy or quality for individual diets with a focus on micronutrient sufficiency.[2,3]

Early childhood development: Defined as the period from prenatal development to 6 years before the child enters formal education (Grade R).[4,5]

ECD services: Services being provided at the ECD centre by a formal/ informally trained person promoting the primary development of young children between 0 – 7 years.[4,5]

ECD centre: Established full day care centre/ sites or crèche were 10 or more children are cared for daily and receive appropriate ECD services.[4,5]

ECD caregiver: Formal or informally trained person responsible for offering non-curriculum based services such as day to day caring, food preparation, supervision of feeding sessions and overseeing children's welfare at the ECD centre.[4,5]

ECD programme: Daily well designed holistic programmes to cover/ promote all aspects of child development at the centre/ site.[4,5]

ECD practitioner: Term encompassing all personnel responsible for the day to day running of services at ECD centre including those trained in ECD education and development and/ or those not qualified but having sufficient experience to facilitate/ make critical decision to run ECD programmes and centres.[4,5]

G9 Tool: Dietary diversity tool used by FAO. The word has been derived from the use of nine major food groups (carbohydrates, vitamin A, fruits, vegetables, legumes, meat, fats and oils, milk and milk products, and eggs).[2]

Global acute malnutrition (GAM): Measures severity of wasting in a population by combining cases of severe acute malnutrition, moderate malnutrition and MUAC (<125 mm).[6]

Height-for-age Z-score (HAZ): Measure to describe deviation of the child's height with reference to a fixed age. A child is referred to as 'stunted' if he/she has a height-for-age z-score of below 90% of the median population.[7]

Non-Centre Based ECD: It is home-based care ECD centre assisting 6/ fewer children, not in centre-based ECD centre.[4,5]

Nutrition corner: It was a designated space in the ECD classroom where different foods/ empty food packs were displayed on the table for the children to learn about food and nutrition.

Nutrition puzzles: These were nutrition-related crossword worksheets, creative jigsaws, toys and, snake and ladder games used to facilitate learning at the ECD centres.

Weight-for-age Z-score (WAZ)**:** Measure to describe deviation of the child's weight with reference to a fixed age. A child is classified as underweight if he/she has a weight-for-age z-score below 80 % of the median population.[7]

Weight-for-height Z-score (WHZ)**:** Measure to describe the child's weight/height ratio, comparing it to a reference point. A child is classified as 'wasted' which means severe thinness when he/she has a weight-for-age below the median.[7]

CHAPTER 1

LITERATURE REVIEW

1. LITERATURE REVIEW

1.1 Introduction

Global studies have shown the role of nutrition in early childhood development and how it contributes significantly to the development of the brain during the early years of life,[8,9] and also links with adult health and wellbeing.[2] A deficiency arising from circumstances such as severe acute malnutrition and diseases severely impact brain development,[8] restrict growth, and increases susceptibility to infection and prolong the duration of disease.[10, 11] Most of the early years might be spent in ECD centres, which will contribute significantly to the child's well-being. Evidence indicates that early childhood development (ECD) has a determining influence on later life chances and health through skills development, education and occupational opportunities.[4,12] It is estimated that over 250 million[13,14] children globally are not achieving their full potential which has huge implications for future prosperity.[15] Early childhood development is a critical period which should be prioritized to ensure that all children have the necessary foundation in terms of his/her nutrition well-being, cognitive, language, physical, social, psychosocial, and emotional development to achieve their full potential.[4] Children's optimal growth and development require adequate nutrition and receiving adequate nutrition is a fundamental right [16] that require an enabling environment, social support and political commitment.[4,5,17] Regardless of socio-economic status, being poor or rich, research has shown that investment in early childhood, family and parenting support have improved outcomes in terms of health inequality and poverty.[5,17,18,19,20] In response to this evidence, the National Integrated Early Childhood Development Policy 2015[5] was approved by the government of South Africa on 9 December 2015. Subsequently, the Guidelines on nutrition for Early Childhood Development Centres was developed and implemented by the National Department of Social Development (DSD) South Africa in 2016.[21]

1.2. Child nutritional status in Sub-Saharan Africa, including South Africa

The first 1 000 days of life, defined as the period from conception to two years of age, is crucial in the development of a child.[22] Globally, and in South Africa, malnutrition which includes both under- and overnutrition is a problem since it has consequences for survival, the prevalence of diseases, healthy development, and the economic productivity of individuals. Stunting[7] is the term used to describe a low height-for-age (H/A), and is indicative of past growth failure and long-term under-nutrition or chronic malnutrition.[23] Studies in South Africa has shown that stunting is the most common nutritional disorder amongst children, with the highest prevalence amongst younger

children, aged 1-3 years, as well as children living in rural areas.[24,25] Stunting creates a vicious cycle affecting generations and has ripple effects that affect the country's productivity and economic growth.[17] Grantham-McGregor et al. identified early childhood stunting as well as the number of people living in poverty as indicators for poor development at country level.[26] Nutrition plays an important role in primary prevention of all forms of diseases.[27,28] Good care during this period reduces the risk of developing various non-communicable diseases such as diabetes, and other chronic conditions later in life; improve an individual's educational achievement and earning potential.[4] Nutritional deficits during early childhood may be irreversible after the second year.[4]

In Maharashtra, India, the prevalence of stunting was reduced by 16% in seven years through delivering proven community-level interventions.[29,30] The strategies used in Maharashtra, India could be adapted to include increased funding for ECD centres, child health care, vaccination, Vitamin A supplementation, growth monitoring, nutrition counselling, infant and young child feeding (IYCF) education, behaviour change campaigns, improved service delivery (water & sanitation), establishing and supporting school gardens, provision of fortified supplementary food, where appropriate, to enhance nutrition and food security.[4,5]

In the last 2 decades, substantial effort has been made in the world to reduce malnutrition prevalence but it is still a burden in Asia and Sub-Saharan Africa.[22] Sub-Saharan Africa has the highest stunting rate at 38% (1 child in every 3 [13]) and under-five mortality rate in the world with 1 child in 12 dying before attaining the age of 5 years.[30,31] The South African Health Review 2012/13 reported that interventions included in South African Health Care policy has made strides in the effort to curb infant mortality.[27] However, to maintain such gains, the policy reiterates the need to promote a safe environment for childcare facilities, improve nutrition well-being of children and support provision of quality ECD interventions.[5,27] Severe acute malnutrition (SAM) in children increase the risk of death from common childhood illness such as diarrhoea, pneumonia, and malaria.[22,32] It is believed that SAM is more prevalent in young children (<12 months) as a result of poor feeding practices and replacement of breast milk with infant formula.[33,34]

The UNICEF conceptual framework on malnutrition illustrates the causes of malnutrition, which can be classified into 3 categories: underlying, basic and immediate causes.[35] Immediate causes, e.g.: infection and inadequate nutrient intake form a vicious cycle that exacerbates malnutrition. If not addressed it leads to restricted growth and mortality, intergeneration poverty and loss of potential income.[36] Poor dietary diversity could also indicate the likelihood of insufficient food intake. It is,

therefore, the duty of ECD centres to provide nutritious meals to children and refer sick children to health facilities for appropriate treatment. Poor infrastructure and congestion in ECD centres can facilitate the spread of communicable/epidemic diseases.[37] Shortages of qualified ECD practitioners to give adequate care to the children due to inadequate resources complicate the challenges ECD centres are facing. Legal frameworks governing the operations of ECD centres may not offer a supportive environment for the ECDs to access funding with ease for improving quality of diets and outlook of their physical environment.[38] Worldwide, those involved with ECDs face challenges relating to issues of governance, policy and framework prioritization. Political leaders are more concerned with implementing policies and programmes that will bring forth political support. It is therefore vital to provide overwhelming scientific data to assist policymakers to prioritize early childhood development. Sustainable Development Goals (SDGs)[39] 3 and 4 which focus on "Good Health and Well-Being for people" and " Quality Education" lay solid foundations for improving child nutrition and promoting ECD by 2030.[14,19,39]

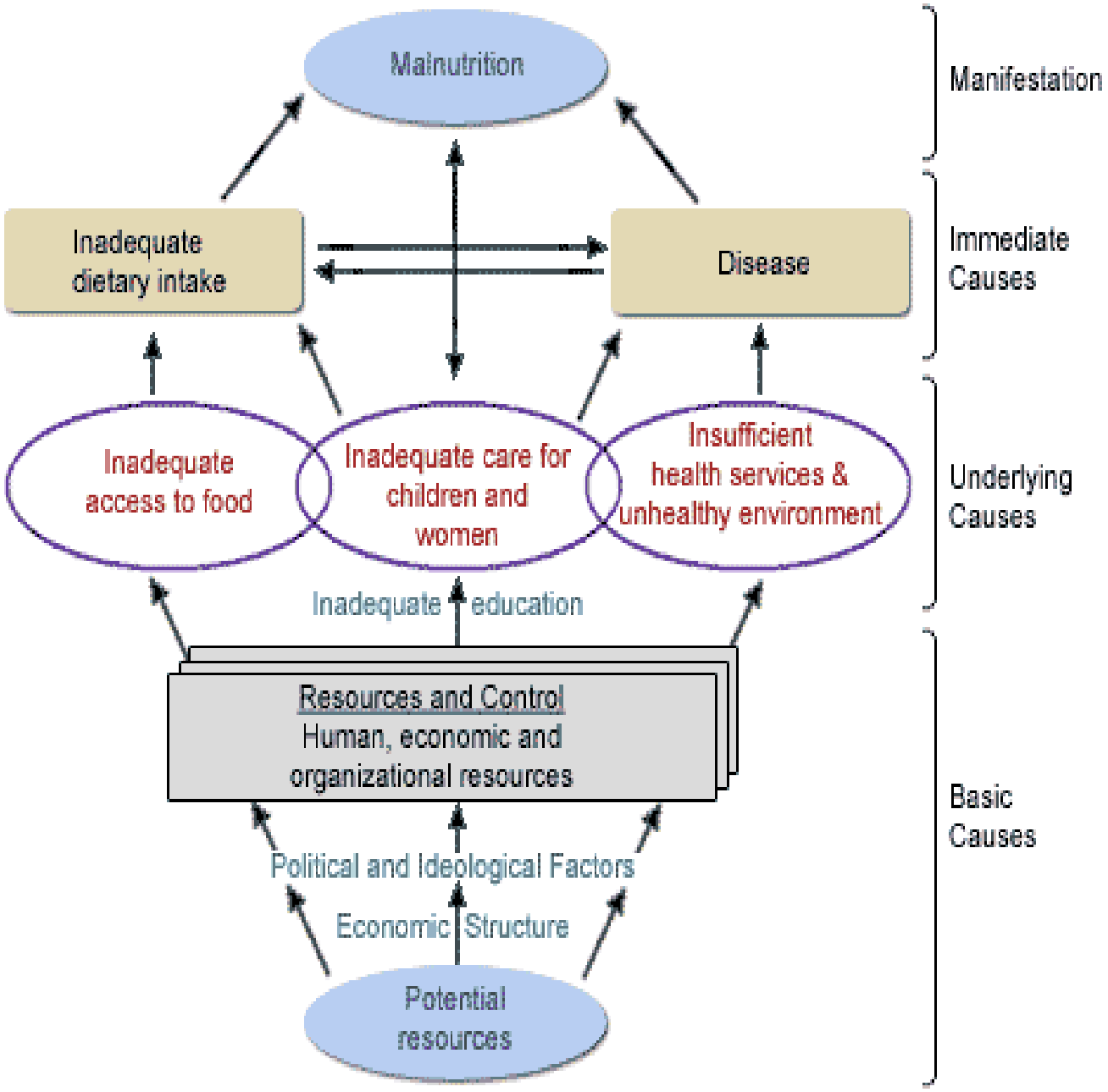


Figure 1.1: The UNICEF conceptual framework on malnutrition[35]

In the recently published 2016 Demographic and Health Survey (SADHS) report and the 2nd Triennial report on mortality and morbidity (CoMMiC), diarrhoea, acute respiratory infection (ARI) and undernutrition were mentioned among others as key causes of mortality and morbidity in under-fives in South Africa.[34] Besides mortality, due to non-natural causes, malnutrition ranked second and attributed to 4% of the deaths recorded.[33] The triple burden of malnutrition (under-nutrition, over-nutrition, and micronutrient deficiencies) continues to be a public health burden,[21] as 27% of South African children are stunted. Underweight remains to be one of the country's common

nutritional disorders affecting as much as 1 in 10 children[34], whereas 3% of the children are wasted, in contrast to 13% who are overweight.[34] Stunting (low height-for-age) figures noted in recent studies reflect endemic "stubborn" malnutrition in the country which will continue to compromise child health. Children under-five are vulnerable to malnutrition, especially in marginalized communities where poverty, food security, unemployment, poor sanitation, inadequate care, frequent illness/high disease burden are prevalent.[4,17,37,40] In several studies, poor micronutrient status have been noted to be common among young children with regards to Vitamin A, Iron, and Zinc.[22] In South Africa, at national level, the vitamin A deficiency prevalence is 44%, iron deficiency anaemia 11%, and zinc 2%.[17] The South African National Food Consumption Survey (NFCS) revealed that most children (0-9 years) consume insufficient diets measured against the dietary diversity score (DDS).[41]

1.3 Current ECD situation in South Africa

South Africa's Constitution recognizes the rights of children, and furthermore, it is a signatory of the United Nations (UN) Convention on the Rights of Child,[42] which created the obligation to prioritize early childhood development.[42,43] Subsequently the country has also put in place the National Integrated Early Childhood Development Policy, which prioritizes investments in early childhood development.[5,45] The aim is to provide opportunities to reduce transgenerational stunting and inequalities by providing a stage appropriate developmental package of quality ECD services to achieve the UN Sustainable Development goals by 2030.[14]

The Government of the Republic of South Africa prioritised early childhood development (ECD) based on a number of reasons. The National Development Plan (NDP) seeks to eliminate poverty and improve the quality of living of all South Africans.[45] With the compilation of the NDP, the social determinants of poverty and health, as well as the need to reduce inequality, was considered.[45] The strong scientific evidence regarding the importance of the early years of human development of children and the need for investing resources to support and promote optimal child development from conception, was also recognised. The NDP refers to the importance of nutrition and diet of children, and interestingly the NDP especially mentions that nutrition is crucial for children younger than three years old as it is essential for sound physical and mental development. The NDP Commission made recommendations on child nutrition and mentioned the need to help parents and families to break the cycle of poverty. This includes providing the best preparation for young children and a proposal that every child should have at least two years of preschool education.[5]

Despite government-led initiatives and reviews on the status of the provision of services in ECD centres, critical gaps remain in maternal and child health care, nutrition support, water, sanitation and hygiene (WASH), family and parental support, quality of early childhood care and education and specialised ECD services for children with disabilities.[5]

An investment in nutrition to reduce under-5 stunting is a key priority for the government and therefore it was included in the M&E framework/plan to track progress on the interventions. KwaZulu Natal province has been in the forefront spearheading nutrition interventions in its various districts.[46] A study in South Africa by Vorster et al entitled, "The everyday experiences of early childhood caregivers" showed that challenges exist in funding and support for ECD centres in marginalized communities. This study also highlighted the need to assess other environments where many children spend a greater part of their time, outside their homes.[47] Attaining basic education is no longer a challenge for citizens in the country, effort should be directed in improving quality of early childhood education and nutrition.[47] Vorster et al. also mention that although an increased number of studies are focusing on ECDs, fewer studies have looked at practitioner/s or caregivers in ECD facilities and therefore this study will contribute to the body of knowledge in ECDs.[47]

An evaluation that reviewed nutrition interventions in South Africa stated there are challenges in coordination of nutrition programmes, which are exacerbated by inadequate funding. Policymakers responsible for allocating funds to national nutrition budgets do not prioritize nutrition.[46] Child survival is a function of multiple domains effectively working together therefore in SA government prioritizes funds for ECDs through various models e.g. DSD facilitates psychosocial support and subsidy, DoE focuses on the provision of education, DoH aims to improve nutrition well being and immunization.[9,48]

Promotion of nutrition is essential in areas of infant feeding, dietary diversity and WASH in ECDs. High impact nutrition interventions the government is currently implementing are; supplementary feeding, food fortification/micronutrient supplementation, complementary feeding programme.[5] Most ECD centres do not enrol children younger than 2 years, as a result, this age group misses important nutrition intervention programmes.[17]

Only ECD centres that are registered with DSD benefit from subsidies and in-house training services.[46] Evaluation studies in communities have shown low uptake of programmes/interventions such as ECD, hygiene and education, complementary food, food production, and preservation.

Practitioners are part of the community social cluster and their action can, therefore, impact the well-being of children in ECD centres.[46]

Agriculture, food systems, safety nets, and education are among proven nutrition sensitive strategies that can help to reduce undernutrition and micronutrient deficiencies in the world.[49] A growing body of evidence has shown that nutrition knowledge and attitude influence observable nutrition behaviours such as removal of certain ingredients in recipes, cooking preferences and food included in the family food basket.[50,51] The Children's Institute 2016 report on the review of early childhood estimated a total population of 6 311 000 children under the age of 6 were living in 9 provinces.[17] Of these children, only 40.3% (2 545 600) were attending ECD programme in 17 828 centres. A publication by Atmore et al discusses many of the challenges the early childhood development sector in South Africa experiences.[44] Atmore et al. state that more than half of children in South Africa live in poverty, and therefore it is fortunate that the South African Department of Social Development (SA DSD), who is responsible for the ECD sector, also offer financial support to eligible children, namely those living in poverty. The Child Support Grant is paid to eligible parents and caregivers in order to meet their basic needs. Furthermore Atmore et al. mention that the relevant government departments (namely the DSD, DoE and DoH), recognise the need to increase access to ECD programmes, as well as to improve the quality of ECD programmes and services, explicitly for children from disadvantaged backgrounds. DSD also acknowledges that education is a basic human right that everyone is entitled to receive within the South African Constitution, and which is fundamental to support human capital development, life-long learning and economic opportunities.[44]

1.4 The role of infant feeding practices in ECDs

Optimal infant and young children feeding entail exclusively breastfeeding infants for the first 6 months of their lives followed by optimal complementary feeding practices are essential. Breast milk provides all the adequate nutrients required by the infant. It prevents episodes of diarrhoeal diseases and excess weight gain, a predisposing factor to diabetes later in life.[52] Appropriate complementary foods should provide high energy dense nutrients to support growth and development during the transition period, 6-24 months.[52,21] Poor nutrition knowledge and feeding practices contribute significantly to chronic or acute malnutrition in ECD centres. Appropriate Infant and young child feeding practices in ECD centres are vital. Inappropriate feeding leads to the development of chronic diseases or obesity, posing public health challenges in both developed and

developing countries.[53,54] Good practices to promote optimal growth such as the provision of balanced diets through quality meals, dietary diversification, appropriate cooking methods, proper food handling, storage, and hygiene, build a good nutrition foundation for children to grow optimally.

Caregiver knowledge of infant feeding and practices beyond the 6 month-period is vital. Poor sanitation poses a threat to children as they are e.g. likely to ingest pathogens from the soil when crawling.[55] ECD practitioners, therefore, need to receive appropriate WASH training in order to always maintain a safe environment for children. Complementary services/support is provided by the responsible stakeholders such as DoH, DSD and NGOs in the form of micronutrient fortification, supplementation, food provision, deworming, immunization and health promotion.[5, 56] To achieve the target of providing adequate nutrients to children in ECDs, the Consultative Group on Early Childhood Care and Development (CGECCD) recommends the need to thoroughly examine the habits, practices of practitioners, and the environment in which children grow-up.[57,58]

1.5 Knowledge and practice approach to assess infant feeding practices

Cross-sectional studies are often conducted in households to assess infant feeding practices using standardized indicators on eating behaviour, food preferences and frequencies, responsive feeding, feeding during illnesses and diet quality.[59] However, the indicators only cover infants and children up to 23 months.[59] Cross-sectional studies methods such as the knowledge, practice and coverage (KPC) surveys or rapid needs appraisals to improve child survival also include the assessment of infant feeding to reveal misunderstandings and obstacles in infant feeding, that may be a threat to behaviour change. These studies require a lot of resources and time, and are complex to conduct the data analysis. Studies that assess and analyse people's nutrition-related knowledge, attitudes and practices (KAP) are a valuable way for gaining an understanding what influences dietary intake. Fortunately the 2014 Food and Agriculture Guidelines for assessing nutrition-related Knowledge, Attitudes and Practices (KAP) Manual was developed to standardise the methodology used in KAP studies, to specifically ensure comparability of the results obtained in surveys.[60]

The KABP approach has been widely used as a rapid assessment tool in studies of various fields.[61] The advantages of using this method are; low cost, rapid, and relatively easy to conduct, and it combines both qualitative and quantitative methods important for providing baseline information for programme planning and implementation.[61] KABP provide the platform for community nutrition programmes aimed at involving different stakeholders in collaboration, planning, implementation,

and evaluation of nutrition components.[57] Interventions to improve nutrition need to be formulated on assessments beyond anthropometric measurements and focus on socioeconomic factors and eating habits of the particular community.[57] Expounding underlying factors influencing observed habits can be done by assessing nutrition-related knowledge, attitude, behaviour, and practice which can be incorporated in quantitative and/or qualitative research.[61]

1.6 Nutrition anthropometric assessments in children

The World Health Organization (WHO) recommends the use weight, height and MUAC measurements in 6-59 months children, as indicators to provide valid information on the nutritional well-being of the children.[6,7] In this study, anthropometric assessments were used to find the magnitude/prevalence of stunting, wasting and underweight in children aged 6-59 months attending ECDs thus enabling comparison with national statistical figures published in the SANHANES report.[25] Using this approach in measuring nutrition status is relatively easy, cheap and quick compared to invasive biochemical and clinical assessments, which require expertise[7]. The simplicity of anthropometric assessment tools make them valuable and suitable for use in nutrition surveillance as well as routine data collection on the prevalence of malnutrition.[5,6] Besides data collection in community surveys, these assessments are also conducted in clinics and hospitals. The data is recorded on the child's growth card, included in the child's Road to Health Booklet used in South Africa and monthly returns/follow-up are promoted.[62] The monthly follow-up consultations also provide an opportunity for healthcare workers to assess the current feeding practices, including diet diversity, and to promote optimal nutrition and care.[62]

1.7 Motivation for this research project

There is a need to ascertain whether ECD practitioners are aware of the consequences of poor nutrition practices and are able to identify children within their ECD centres who are malnourished. If the children are identified through the ECD centres, the role of ECD owners, practitioners and caregivers in liaising with parents to ensure that children receive appropriate referrals, treatment, and follow-up thereafter should be clear. It is vital for all ECD stakeholders i.e. government, ECD forums and private sectors (NGOs) to formulate the best health promotion strategies of linking the ECD centres to the community for sustainability of nutrition programmes proposed in the integrated ECD policy.

There is a scarcity of information regarding the current nutrition knowledge, attitudes, behaviours, and practices of practitioners working in different ECD settings in Gauteng province. The study reported here was planned to provide a better understanding of the current nutrition knowledge, attitudes, behaviour, and practices of ECD practitioners in two areas that are representative of formal and informal areas in peri-urban Johannesburg City in the Gauteng province.

CHAPTER 2

RESEARCH DESIGN AND METHODOLOGY

2. STUDY PLAN

A descriptive and analytical, cross-sectional study was designed which included both qualitative and quantitative methods. Information was collected regarding the current nutrition knowledge, attitudes, behaviours, and practices of practitioners in two different ECD settings in Gauteng province. The two areas included in the study were selected for convenience to execute the study, and are similar to most formal and informal areas in peri-urban Johannesburg City in the Gauteng province.

The research question for this study was**:** What is the nutrition situation in ECD centres in Zandspruit and Orange Farm?

Aim: To investigate the nutrition situation in ECD centres in Zandspruit and Orange Farm

The Objectives of the study were:

a) To assess the nutrition knowledge and practices of practitioners working in ECD centres in Orange Farm and Zandspruit areas.
b) To assess the diet diversity of the current menus provided to children at the ECD centres in Orange Farm and Zandspruit areas.
c) To describe the anthropometric status of children 6-59 months attending ECD centres in Zandspruit and Orange Farm.

Data collection tools included a structured questionnaire (Addendum 1), nutrition assessment form (Addendum 2), dietary diversity tool (Addendum 3A and B) and focus group discussion guide (Addendum 4).

The timeframe for the project is depicted in Table 2.1.

Table 2.1 Research timeframe

ACTIVITIES	Nov 2015	Mar 2016	Jun 2016	Jul 2016	Oct 2016	Nov 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May -Aug 2017
1. Application for ethics approval											
2. Resubmission of amended protocol											
3. Ethics approval											
4. Application and permission sought from DSD Provincial Office, Gauteng											
5. Translation of questionnaires											
6. Pilot study											
7. In-depth interviews											
8. Nutrition assessments											
9. Focus group discussions											
10. Data analysis											
11. Thesis writing and submission											

*DSD- Department of Social Development

2.1 Study population:

The study frame included all ECD centres in the purposefully selected study area of Zandspruit and Orange Farm. The principal researcher wanted to compare nutrition knowledge and practices in ECD centres in two different settings; an informal and formal settlement. The principal researcher chose Zandspruit which is an illegal informal settlement in Honeydew suburbs, 28 kilometres (km) west of Johannesburg city. Many dwellers in this area are living in poverty, have poor housing facilities (shacks) with illegal electrical connections, lack social amenities, overcrowded and some areas are inaccessible by road.[63]

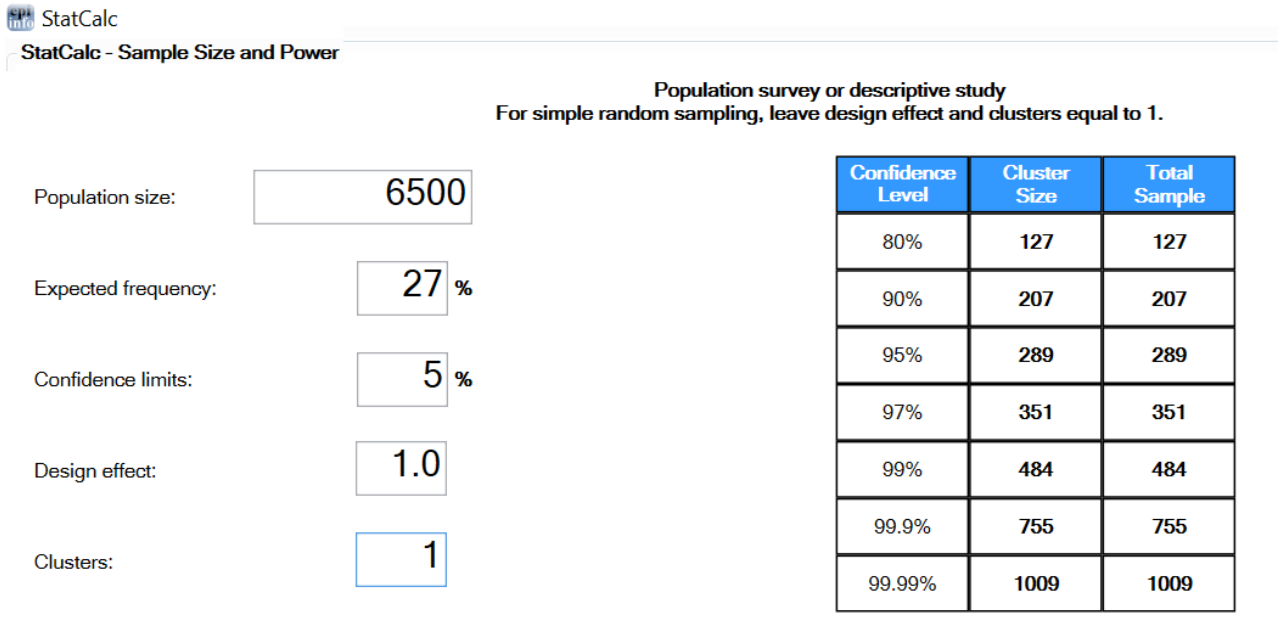
In contrast, Orange Farm is a well-developed settlement situated 58 km south of Johannesburg city; families have proper housing, self-built or constructed by the government under the reconstruction development programme (RDP) with spacious and clearly distinct yards, piped water and accessible by road from all angles.[64]

Information regarding all ECD centres (both registered and non-registered) was obtained from various sources including the Gauteng Department of Social Development (DSD), ECD Forums and NGOs operating in the enumeration areas of Zandspruit and Orange Farm. There were 16 ECD centres in Zandspruit and 200 in Orange Farm. The study population included the principals who govern these ECD centres, practitioners, as well as the children attending these centres. Principals or practitioners at the selected centres were interviewed while anthropometric assessments were done for a sample of all children (boys and girls) 6-59 months in randomly selected ECDs (n=15).

2.2 Selection of Sample:

Enumeration zones were divided into 2 clusters by settlement types; formal (Orange Farm) and informal settlement (Zandspruit) and in each of these, all ECD centres (both registered and non-registered) were included for the random sampling process. With a 95% confidence interval (C.I), a sample size of 15 and 120 ECD centres were derived for Zandspruit and Orange Farm respectively. A list of potential, participating ECD centres were compiled from a randomly selected sample using the computerised software programme: “THE HAT version 3.0.8; 2013”.

EpiInfo 7 was used to calculate the final sample size for the anthropometric assessment. Sample sizes of 237 and 289 children were derived from an approximate enrolment of 1100 for Zandspruit and 6500 in Orange Farm respectively (C.I of 95). Figure 2.1 depicts the population calculation for Orange Farm. All the children aged 6-59 months at the ECD centre were selected for anthropometric measurements in 7 centres in Zandspruit and 8 centres in Orange Farm.


StatCalc

StatCalc - Sample Size and Power

Population survey or descriptive study
For simple random sampling, leave design effect and clusters equal to 1.

Population size: 6500

Expected frequency: 27 %

Confidence limits: 5 %

Design effect: 1.0

Clusters: 1

Confidence Level	Cluster Size	Total Sample
80%	127	127
90%	207	207
95%	289	289
97%	351	351
99%	484	484
99.9%	755	755
99.99%	1009	1009

Figure 2.1 Orange Farm population survey or descriptive study results table

2.3 Inclusion and Exclusion Criteria

2.3.1 Inclusion Criteria

All ECD Practitioners and children aged 6-59 months at each ECD centre were eligible for inclusion via simple random selection. The definition "an ECD centre is a place of full/ partial day-care and development of children from birth until the year before they enter formal school" was used in this study.[5]

2.3.2 Exclusion Criteria

Non-centre based ECD or home-based care centres caring for less than 6 children were excluded.

2.4 Methods of data collection

2.4.1 Data Collection Tools

Four research tools were used for data collection, namely:

I. In-depth structured questionnaire (Addendum 1)
II. Nutrition assessment form (Addendum 2)
III. Dietary diversity form (Addendum 3A and 3B)
IV. Focus group discussion guide (Addendum 4)

The in-depth questionnaire was designed and loaded on a mobile platform while the nutrition assessment and dietary diversity forms were printed on paper. The principal researcher/ assistants used their cell phones to audio record the focus group discussions.

2.4.2 Mobile Technology

Kobocollect free software[65] was used to collect the information on android mobile phones and tablets. The software is freely available for downloads on Google play store, simple to use on handheld digital gadgets, reliable, low cost allows offline data collection and synchronization on existing database.

The use of software on cell phones and tablets reduced data handling errors, saved on printing paper and consequently time for data capturing. While developing or programming the questionnaires to deploy on the mobile platform, the principal researcher added codes and validation rules to ensure that questions were correct or sound in terms of the responses they elicit. Questionnaires were assigned unique identification numbers to ensure that they did not override information when saved offline and later uploaded online. A Java command was run to find and list errors on the questions and responses. Restrictions were also added to compulsory questions to ensure interviewers could not skip them. Number variables were used for coding the responses to questions ensuring easy data analysis in Excel and SPSS. After completing each interview session, the interviewer clicked the finish button and the software quickly uploaded the completed questionnaire with responses to the Kobocollect website. The data was downloaded daily after completing fieldwork, to be analysed.

The research assistants used their personal cell phones for the interviews and completing the in-depth questionnaires. The principal researcher provided data (600 Mb) for each research assistant to use throughout the entire survey period and also availed a tablet for use when challenges were experienced with personal mobile phones.

2.4.3 Quantitative Data

The principal researcher developed an in-depth questionnaire (Addendum 1) based on the knowledge and experience working as a nutritionist implementing and coordinating community nutrition programmes. The principal researcher also used the UNICEF's conceptual framework of malnutrition[34] and adapted concepts from the FAO KAP guidelines.[60] A nutrition assessment form (Addendum 2) and the dietary diversity tool (Addendum 3) was used to collect data in ECD centres. The focus of the assessments was child health care, nutrition support, water and sanitation (WASH), family and parental support, quality of early childhood care and education and specialised ECD services for children with disabilities.[2, 5, 21]

2.4.3.1 Dietary Assessments

The dietary diversity tool (Addendum 3A and 3B) was used in 123 ECD centres (14 in Zandspruit and 109 Orange Farm) as a method to assess the dietary quality of the meals provided at the ECD centre.[66] It was only applied to meals offered at the ECD centres within the preceding 24 hours, excluding meals consumed at home and outside the ECD centre. At each of the selected ECD centres, the principal researcher and the team asked the practitioners at the ECD centre to recall the food they had given to the children over the preceding 24 hrs to quantify dietary quality of the meals consumed at the ECD centres.[66, 67, 68] The FAO dietary diversity nine food group tool (Addendum 3B) was adapted to local food groups.[2,66] The tool is regarded as highly sensitive and specific for preschools assessments. It assesses the following food groups; (1) cereals, roots and tubers; (2) vitamin-A-rich fruits and vegetables; (3) other fruit; (4) other vegetables; (5) legumes and nuts; (6) meat, poultry and fish; (7) fats and oils; (8) dairy; and (9) eggs.[3, 66, 67]

2.4.3.2 Anthropometric Assessments

Anthropometry is a non-invasive, inexpensive way to measure an indication of the nutritional status of an individual or population group. Results reflect the economic and social well-being of populations.[7] In this study, the principal researcher used the World Health Organization (WHO) standard procedures to measure weight, height and mid-upper arm circumference (MUAC) of children aged 6-59 months.[7] Specific instruments and techniques were employed and are further described below.

2.4.3.2.1 Bodyweight

During the anthropometric assessments of children 6-59 months, weight was measured to the nearest 0.1 kg using a portable electronic scale (Soehnle Professional Scale 7840). The scale was calibrated using weights of 5 kg mass. Children were weighed in light clothing, standing upright in the middle of the scale.

2.4.3.2.2 Height

A Soehnle portable stadiometer was used to measure the height of children > 2 years or 85 cm and above to the nearest 0.1 cm. Children were barefooted, heels together, thighs and the shoulder plate touching the upright part of the stadiometer. Headgears were removed where appropriate and estimations were done in scenarios where children had plaited or interlaced hair. Measurements were taken after positioning the head in the Frankfurt plane with both hands lowered and the measuring arm of the stadiometer firmly positioned on the head. A Soehnle portable mat was used to measure recumbent length for children < 2 years or < 85 cm. The mat was placed on an even, uncarpeted surface and the child placed laying on his/her back, facing upwards and the head touching the fixed board of the mat and the feet resting on the movable board. ECD centre practitioner/s were requested to hold the child in the position mentioned above while the researcher slid the footboard ensuring that the legs were straight.[7]

2.4.1.2.3 Mid-Upper Arm Circumference

In taking MUAC measurements, researchers had to carefully bend the child's elbow so that it was 90^0 and then mark the midpoint between the tip of the shoulder and elbow, relaxed the hand (pulled hand down) and then measured the circumference of the upper arm around the

marked point. MUAC was assessed using a standardised non-elastic colour coded MUAC tape and values measured to the nearest millimetre (mm). Researchers checked for bilateral pitting oedema and recorded it during the assessments.

Two measurements were taken, and if it differed with more than 0.5 kg for weight, 1 cm for height and length, or 0.5 cm for MUAC a third measurement was done, to ensure accuracy.

2.5 Qualitative Data

2.5.1 Focus Group Discussions

Focus group discussions were facilitated by the research team comprising of the principal researcher and the research assistants and recorded as audio and notes. A unique number was allocated to distinguish the FGDs. In Zandspruit, 1 focus group discussion was convened (FGD 1) and 4 FGDs (FGD 2, 3, 4 and 5) in Orange Farm with ECD forum leaders, principals and practitioners of non-participating ECD centres.

The principal researcher and 3 research assistants conducted 5 focus group discussions, 1 in Zandspruit and 4 in Orange Farm. In each of the FGD, a different person moderated while 3 others took notes. At the end of each focus group, the team consolidated notes and captured it in one report. Data saturation guided the number of FGDs that needed to be conducted, but for the planning of the FGDs, it was deemed essential to conduct FGDs in both Zandspruit and Orange Farm. In Orange Farm, 60 out of 80 ECDs centres that had not participated in the in-depth interviews were randomly selected for the FGDs. Four ECD centres were identified for the FGD sessions based on accessibility, centrality and availability of a spacious classroom. Research assistants spoke to the principals inviting them to send a representative to participate in the FGDs at the selected sites.

The focus groups targeted a minimum of 8 to a maximum of 15 people per group, each ECD centre providing one participant. In Zandspruit, research assistants approached principals of the 14 ECD centres who participated in the research and asked them to send a representative/practitioner who had not participated in the in-depth survey. The FGD was conducted at the centre where forum meetings are usually convened.

2.6 Fieldworker Training

The principal researcher facilitated the training of 3 research assistants for Zandspruit and Orange Farm. The research assistants were qualified community development facilitators whose fixed-term contracts with the organization that also employed the principal researcher had ended in December 2015. The research assistants were not occupied during the time of the research and were familiar with community participatory approaches and applied research. The training lasted for a day and covered the following topics: background to the research, completing the questionnaires and conducting focus group discussions. With the aid of colleagues and the research assistants, questionnaires were translated into the following local languages: Sesotho, Zulu, Xhosa and Venda. Preliminary information from 2011 census data showed that those who spoke Zulu, Xhosa and Sesotho predominantly inhabited the study area.[69] To ensure validity and reliability the research assistants followed two steps: first, they involved local people in the Orange Farm and Zandspruit to assist with the comprehension of the translated questionnaires. Thereafter a research assistant approached tertiary students attending various courses at Orange Farm skills centre who then translated the questionnaires back to the original languages to check and ensure validity and reliability.

ECD centre practitioner/s was interviewed using a structured in-depth questionnaire (Addendum 1). Interviewers gave the practitioner/s consent forms (Addendum 5) and he/she signed upon consent that he/she fully understood the scope of the survey and agreed to proceed. The interview with the practitioners lasted for about 30 minutes.

2.7 Pilot Study

To assess the content validity of the questionnaires it was sent to the Gauteng Provincial Director of Maternal Child Health and Nutrition who distributed it to a few dietitians working under him. No changes were made to the developed questionnaire, as they all commented that they believed the questions were valid. After consultation with the study supervisors it was agreed to proceed with the pilot study which included face validity. A day was allocated for piloting all the questionnaires (tools) in Zandspruit and Orange Farm. Pilot studies were conducted in the two areas to assess feasibility and appropriateness of the research tools and to ascertain if the objectives will be met and whether the methodology was appropriate. This

exercise tested whether the in-depth questionnaire (Addendum 1) was correctly understood or interpreted. The principal researcher spearheaded the pilot studies and all 3 research assistants were involved. One pilot FGD was convened in each of the study areas. The research team discussed and revisited unclear questions for clarification and amendments were done. The final copy of the questionnaire was reloaded on the phones or tablets before data collection commenced. It took 50 minutes to complete the questionnaire during the pilot study.

2.8 Analysis of Data

2.8.1 In-Depth Questionnaire

The principal researcher downloaded data from the Kobo online server, cleaned outliers and sent part of the data to a statistician for advanced analysis. Data were analysed using statistical package for social scientist (SPSS) 16 software and Excel 2010. Results were expressed as percentages, standard deviations, mean values and knowledge scores.

Using SPSS 16, scores on knowledge of a balanced diet were calculated by allocating 1 point when the respondent mentioned each nutrient constituting a balanced meal i.e. carbohydrates, proteins, vitamins/minerals, fats/oils and water, thus 5 points maximum were possible.

The same approach above was also applied to calculate scores on knowledge of malnutrition. A point was allocated for mentioning one respond to causes, and signs and symptoms of malnutrition. The points were then summed to obtain the final score for the 2 questions.

2.8.2 Anthropometric Data

Emergency nutrition assessment (ENA) software 2011[70] was used for calculation of the anthropometric assessments. Indices for malnutrition were defined as per the following WHO 2006 definitions; underweight (<-2 SD weight-for-age, WAZ), Stunting (<-2 SD height-for-age z-score, HAZ), wasting (<-2 SD weight-for-height z-score, WHZ) and overweight (>=2SD BMI-for-age Z-scores, BAZ).[7,23] MUAC classification for severe acute malnutrition (SAM) was values < 115 mm and moderate acute malnutrition (MAM) values >=115 and < 125 mm.[7,23]

The researcher calculated global acute malnutrition (GAM), defined as the sum of SAM and MAM cases. GAM classification of malnutrition is based on the following ranges; wasting: acceptable 0-5 %, poor 5-10 %, serious 10-15 %, critical> 15 %.[6, 23]

Statistical tests such as Chi-square, Kurtosis, Index of Dispersion (ID), Poisson and Shapiro-Wilk were done and data were expressed as frequencies, standard deviations and p-values. Results were presented in comparison tables, graphs and descriptive and analytical statistics.

The statistician provided a plausibility report (Addendum 10) on quality of the anthropometric assessment data.

2.8.3 Dietary Diversity Data

Downloaded data was analysed using SPSS version 16. Statistical analysis was done and data were expressed as frequencies, standard deviations. The principal researcher used dietary diversity score (DDS) categories (low dietary diversity =-≤ 3, median dietary diversity=4-5 and high dietary diversity≥ 6) to describe the diet quality of the meals the children received at the ECD centres.[3]

2.8.4 Focus Group Discussion Data Collection

FGD responses were noted down by 3 different people in the research team; principal researcher/ assistants. The research team conducted discussions to resolve differing opinions and to consolidate results to obtain a general FGD report. This was necessary to ensure validity and reliability of the results and eliminated possible reporting bias by principal researcher. The word document with qualitative data for each FGD was imported and coded in NVIVO 10 trial version for Windows software for further analysis.[71] NVIVO is software used to analyse data for qualitative and mixed methods research. The sophisticated software assists in data analysis directly from word documents, spreadsheets, portable document formats (PDF), interviews, images, audio, video, web pages, Twitter and Facebook. After importing, the data is coded by highlighting key themes/categories from the responses and results can be expressed as mind maps, word clouds and trees, frequencies and comparison diagrams, and in this study, the word cloud was used.

The framework of analysis in NVIVO 10 included the following coding;

i. ECD Challenges

ii. Governance in ECDs
iii. Support services
iv. Training requirements
v. Funding
vi. Resources for ECD settings
vii. Policies
viii. Advocacy and communication
ix. Knowledge, attitudes, practices and behaviours

2.9 Ethical and Legal Aspects

2.9.1 Ethics

The research protocol was approved by Stellenbosch University's Health Research Ethics Committee (registration number S15/12/280, Addendum 8). Research immediately commenced after permission to conduct the study was granted by the Gauteng Provincial Department of Social Development (DSD).

2.9.2 Consent

Consent forms, Addendum 5 and 6, were given to the participating ECD principals, practitioners and parents/caregivers to provide consent for the children to be included in the study at the chosen ECD centre. Sufficient effort was made to cater for parents/ caregivers who were hard to reach to obtain their consent. Research assistants and the principals called the parents involved and arranged convenient dates and times to meet at the ECD centres to go through the consent forms. The researcher fully explained the scope of the research to all participants. The consent form (Addendum 5) was also used for the focus group discussions. The information obtained during data collection was primarily done for degree purposes. A secondary purpose could be communication of the research findings to DOH and DSD to support nutrition programming. The researchers signed all declaration forms acknowledging that he/she fully explained the information on the consent form to the participant and the participant was encouraged to ask questions in order to ensure they were satisfied and adequately understood all aspects of the research.

CHAPTER 3

RESULTS

3. RESULTS

Demographic results reported in the following sections pertain to two groups of participants, namely the practitioners involved with the running of the ECD centres and secondly children attending the ECD centres.

3.1 Demographic information of study participants (practitioners)

The in-depth interview response rate for Zandspruit was 87.6 % (n=14) and 95.8 % (n=115) for Orange Farm. In Zandspruit, 1 ECD centre, refused to be interviewed citing displeasure with the government, academic institutions and private sectors for failing to support the centre's initiative of looking after disabled children in the community. In Orange Farm, 5 ECD centres were no longer in existence during the time of data collection. The owner of an ECD, who was also the principal, passed away and the centre was subsequently closed. Information for 6 ECD centres in Orange Farm was removed during the data cleaning process due to the GPS coordinates that fell outside Orange Farm demarcation when plotted on Google map.

The results in Table 3.1 shows that the main participants in the study were ECD principals (62.6 %; n=77), followed by practitioners (31.7 %; n=39).

Table 3.1 Designation of study participants

	Principal % (n)	Practitioner/s % (n)	Board Member % (n)	Owner % (n)	Relative % (n)	Total % (n)
Male	4.1 (5)	0	0	0	0.8 (1)	4.9 (6)
Female	58.5 (72)	31.7 (39)	0.8 (1)	3.3 (4)	0.8 (1)	95.1 (117)
Total	62.6 (77)	31.7 (39)	0.8 (1)	3.3 (4)	1.6 (2)	100 (123)

All the 123 ECD practitioners in this study were of African descent, with males comprising of 4.9 % (n=6) and females 95.1 % (n=117). The age group of the practitioners ranged from 18-65 years. There was no significant difference (p=0.507) in the ages of ECD practitioners in Orange Farm and Zandspruit ECD centres, with the mean ages being 43.47 years (standard deviations (SD) = 11.82) and 41.21 years (SD= 12.84) respectively. Main languages spoken by respondents were Sesotho at 44.7 % (n=55), Zulu 39 % (n=48), Xhosa 5.7 % (n=7), Tswana 5.7 % (n=7), Venda 0.8 % (n=1) and Tsonga 0.8 % (n=1). The predominant religion amongst the

participants was Christianity at 99.2% (n=122), followed by African tradition at 0.8 % (n=1). In terms of qualification, 58.5 % (n=72) of participants had Matric plus a National Certificate (NQF 4), 26 % (n=32) had Matric only (NQF 4), 10.6 % (n=13) had no formal qualification, 4.1 % (n=5) had a Higher National Certificate/Diploma (NQF 5) and 0.8 % (n=1) had a degree (NQF 6) as shown in Figure 3.1.

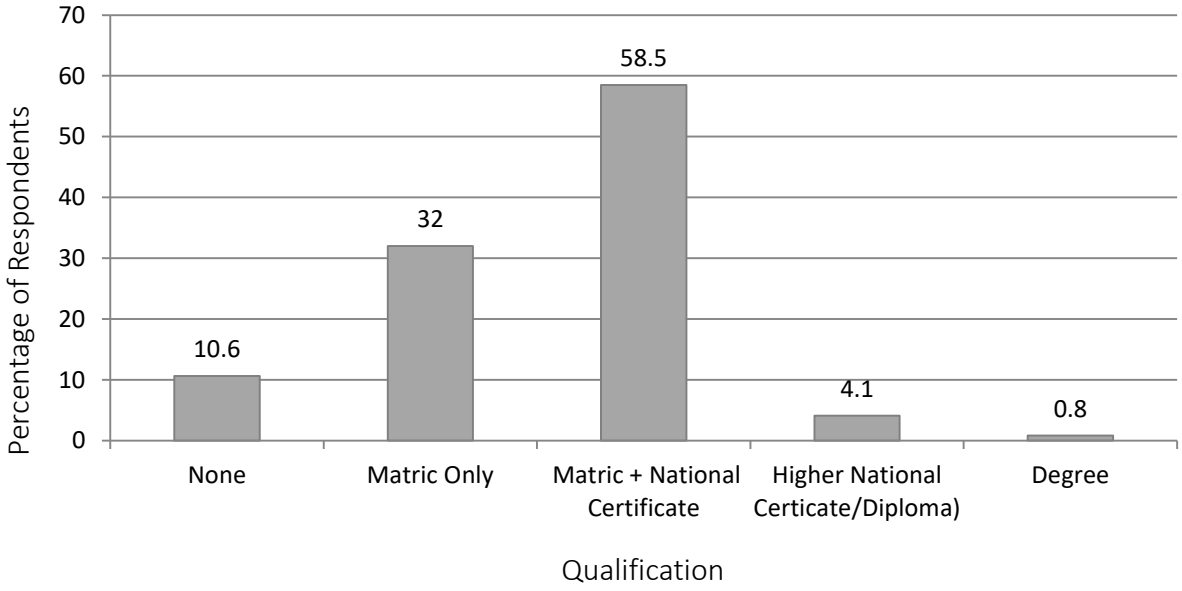


Figure 3.1 Educational levels of ECD practitioners in Zandspruit and Orange Farm

3.1.2 Demographic information of study participants (children)

In the 123 ECD centres where the study took place, the total enrolment figure for all children was 5 084 of which 52.5 % (n=2 671) were boys and 47.5 % (n= 2 413) were girls. The results in Table 3.1.2 below show that there were fewer children in the age group 0-24 months.

Table 3.1.2 The demographic information of children in study

Age group (months)	0-6	7-24	25-36	37-48	48 -60
Number of children (n)	108	820	1 369	1 453	1 334
Group percentage (%)	2.1	16.1	26.9	28.6	26.2

3.2 Nutrition knowledge of the practitioners

About 52 % (n=64) of the respondents who had the Matric + National Certificates said they had received nutrition education during their training and workshops conducted by DSD

(Table 3.2.1). Other trainings that the respondents received included leadership training, (57.7, n=71) management and finance, (57.7, n=71), and first aid and emergency (72.4 %, n=89).

Table 3.2.1 ECD Skills training

	ECD Skills Training					
	Food nutrition and hygiene % (n)		Leader, admin and finance % (n)		First aid and emergency % (n)	
	Trained	Not trained	Trained	Not Trained	Trained	Not Trained
Orange Farm	52.3 (57)	47.7 (52)	60.6 (66)	39.4 (43)	71.6 (78)	28.4 (31)
Zandspruit	50.0 (7)	50.0 (7)	35.7 (5)	64.3 (9)	78.6 (11)	21.4 (3)
Total ECDs	52.0 (64)	48.0 (59)	57.7 (71)	42.3 (52)	72.4 (89)	27.6 (34)

The perceived causes of malnutrition in children (Table 3.2.2) were mentioned as consuming unhealthy diets (food prepared in poor/ unhygienic environments) (60.2 %, n=74) and inadequate nutrient intake (45.5 %, n=56) and 8.1 % (n=10) believed eating stale food is a contributing factor. The majority of practitioners did not know that congenital organ defects (98.3 %, n=121) and infections (94.3 %, n=116) can cause malnutrition. Age had a significant difference on knowledge of causes of malnutrition (p<0, 0001) e.g. older practitioners provided more correct responses. Qualification and language spoken had no significant effect on knowledge of perceived malnutrition causes, p=0.525. The practitioners generally scored low on causes of malnutrition, as indicated by the mean knowledge score of 1.51 (SD=0.72) out of a possible score of 6.

Table 3.2.2 Perceived causes of malnutrition of ECD practitioners

Causes	Responses %, (n)
Inadequate food intake	45.5 (56)
Eating unhealthy diet	60.2 (74)
Eating stale foods	8.1 (10)
Congenital organ defects	1.6 (2)
Infections (bacterial, viral, parasitic fungi)	5.7 (7)
Others (inadequate child care)	30.1 (37)

In this study, 48.8 % (n=60) of the practitioners had heard about malnutrition and could cite groups vulnerable to malnutrition in the study areas. The respective responses were 53.6 % (n=59) mentioned children under five years, 3.6 % (n=4) adolescents, 9.1 % (n=10) the elderly people, 21.8 % (24) women, 11.8 % (n=13) pregnant and lactating mothers. Surprisingly 53.7 % (n=66) practitioners reported malnutrition was not a problem in their communities while 46.3 % (n=57) cited it was.

A number of responses were recorded for local terms of malnutrition (Table 3.2.3) which included: "Phepompe", "iKwashu", "Ukungondleki", "Phepo esentle", "Lekhwekhwe", "Moketa", "Tlala", "Phephelo ya tlase", "Serathane" However, 51.2 % (n=63) still had never heard about malnutrition. It emerged that Sesotho (n=21) and Zulu (n=19) languages had more local terms for malnutrition but no significant difference in language versus knowledge score was found (p=0.904).

Table 3.2.3 Local terms of malnutrition

Language	Local terms for malnutrition	Definitions
Zulu Xhosa	IKwashu/ Ikwashi	it is Kwashiorkor
	Isipho sendlala	a gift of hunger
	Ukungondleki	not growing well, restricted growth/ undernourishment
Sesotho Tswana	Phepompe	bad feeding
	Phepo esentle	not healthy feeding
	Phepho ya tlase	underfeeding/ an ailment pushing health down
	Phepo esa lokang	disease of not eating good food/ wrong feeding
	Moketa	very thin/ wasted/ slender body
	Tlala	a result of hunger and starvation
	Serathane	useless body
	bofokofi ba diaha mmele	weak body
Others (Venda)	Ikwaxu, Kwashiorkor	it is Kwashiorkor

During the interview session, the practitioners were asked if they had children present with signs and symptoms of malnutrition. The question sought to confirm if malnutrition was a problem in ECD centres and to assess the ability of practitioner/s to recognize affected

children. The principal researcher/research assistants assessed the children brought forth to verify reported cases of malnutrition. Of the children mentioned by the practitioners, 4.9 % (n=6) presented with severe wasting, based on their anthropometric assessment when, 10.6 % (n=13) had wrinkled skin, 7.3 %, (n=9) had cloudy/sore eyes, 1.6 % (n=2) had uncontrolled muscle movements, 8.9 % (n=11) had growth restriction, 0.8 % (n=1) had slow wound healing, 1.6 % (n=2) had a distended abdomen, 2.4 % (n=3) were miserable. No cases of oedematous malnutrition were found on the perceived swelling reported in 5.7 % (n=7) of the children. All participants spelt out that the "wrinkled skin problems" indicated eczema, for which some had medication to help ease the rash or itching. Researchers spoke to the principals to liaise with parents to take severely wasted children to the clinic for further assessments. The principal researcher made follow-up appointments during the study for 2 critical cases in Zandspruit. At one of the ECD centres, the parent quickly deregistered her child after the principal spoke to her and at the other centre, parent professed ignorance of discussing the child's health status with the principal.

Table 3.2.4 Perceived knowledge on signs and symptoms of malnutrition

Signs & symptoms of Malnutrition	n (%)
Discoloured hair	46 (37.4)
Distended abdomen	24 (19.5)
Weak powerless	51 (41.5)
Moon face	35 (28.5)
Severe wasted	33 (26.8)
Vomiting	21 (17.1)
Diarrhoea	16 (13)
Others (restricted growth, peeling skin, swelling feet,)	54 (43.9)

Results show that 68.2 % (n=84) of the respondents did not know the causes of oedema or swelling of both feet in children aged 6-59 months. Figure 3.2 shows the percentages of responses reporting the causes of oedema. Only 43.2 % (n=53) of the respondents were correct in mentioning that this means "not eating well" (n=33) and "malnutrition" (n=20).

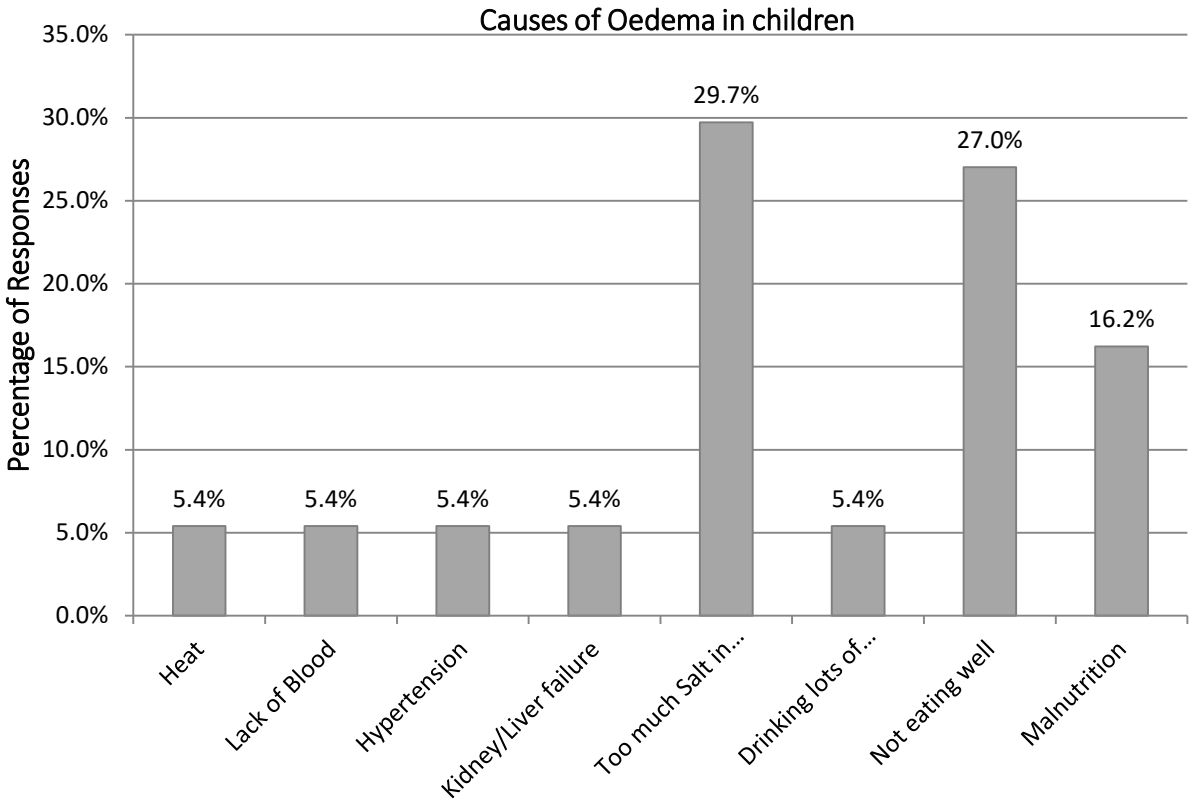


Figure 3.2 Knowledge on causes of Oedema in children 6-59 months

No significant difference in terms of malnutrition knowledge of ECD practitioners in Orange Farm and Zandspruit was observed (p=0.442). About 78.9 % (n=97) of the interviewees had never heard about anaemia and associated signs and symptoms.

Of the 21.1 % (n=26) participants who reported that they had heard about anaemia, some could mention the following sources of iron-rich foods, (Figure 3.2.4.) and 15.4% (n=4) mentioned beverages, i.e. English tea, as foods that decrease iron absorption.

Table 3.2.5 Iron-rich foods known to participants

	Responses	
Foods	n	(%)
Organ meat	20	15.4
Flesh meat	11	8.5
Seafood	4	3.1
Green leafy vegetables	19	14.6
Others foods (Soya mince, lentils)	6	4.6

3.2.1 Sources of Information, education and communication

The different sources where respondents had heard information about malnutrition is summarised in Table 3.2.6. More respondents had heard from the radio and television (41.9 %) than during training (34.9 %) and from nurses (31.4 %).

Table 3.2.6 Source of information about malnutrition

		Responses	
		n	%
IEC source*	Nurse	27	31.4
	Learned from training	30	34.9
	Posters and pamphlets	10	11.6
	TV or radio	36	41.9
	Parents	8	9.3
	Peers	2	2.3
	Others	9	10.5

* IEC – information, education and communication

It was noted that 67.5% (n=83) of respondents reported that they designed menus based on their knowledge of providing a balanced diet to the children while 19.5 % (n=24), planned menus according to food availability and affordability on the market. About 4.1 % (n=5) had no planned menus. It was found that 8.9 % (n=11) of practitioner/s did not know how the menu plans were formulated. Of the respondents who mentioned “balanced diet”, only 32.5% (n=27) were able to correctly define the term. When comparing the knowledge of ECD practitioners to define the constitution of a balanced diet, ECD centre practitioners in Orange Farm were more knowledgeable than those in Zandspruit, with mean scores on knowledge of balanced diet constitution being 2.34 and 0.93 respectively out of possible 5 points

(p<0.0001). Table 3.2.7 shows many role-players were involved with the design and approving of the menus, but for the majority of ECD centres, the principals had this responsibility.

Table 3.2.7 Role-players designing and approving menus at ECD centres

Characteristic	Principal n (%)	Practitioner/s n (%)	Committee n (%)	Parent/s n (%)	Dietician n (%)	Others n (%)
Design Menu	79 (78.2)	9 (7.8)	13 (11.3)	-	3 (2.6)	11 (9.6)
Approve Menu	62 (53.9)	6 (5.2)	21.7 (21.7)	5 (4.3)	6 (5.2)	11 (9.6)

3.3 Practices regarding food and nutrition provision and care of practitioners

The different strategies employed by practitioners to encourage children to eat during meal times are summarised in Table 3.3.1. Common positive strategies were, giving more attention to children who refuse food and talk to them (36.1%, n=44), and say encouraging words to children (29.4 %, n=36). Around fourteen percent (n=18) believed whipping/ beating the child or using some form of force was necessary to enable him/her to eat.

About 84.6 % (n=104) ECD centres owned a refrigerator which was used to store mainly chicken and frozen vegetables to avoid spoilage. Pertaining to perceived risks of food spoilage, 92.4 % (n=98) practitioner/s understood the concept of refrigeration that it does not destroy germs but only slows down the spoilage rate and thus should be avoided by preparing adequate portion sizes for the children and leftovers be given to aftercare children, orphans and vulnerable families. About 44.4 % (n=4) ECD centres without refrigerators ensured they discarded leftovers.

Table 3.3.1 Practices regarding food and nutrition provision and care of practitioners

Question	Yes n (%)	No n (%)
Prepare different meals for each age group	56 (45.5)	67 (54.5)
Help children who refuse to eat during meal times	74 (60.2)	49 (39.8)
Say encouraging words to children	36 (29.4)	87 (70.6)
Others (Believed the need to force children to eat)	18 (14.7)	105 (85.3)
Take a leading role demonstrating to children to eat	17 (14.1)	106 (85.9)
Give more attention to children who refuse food, talk to them.	44 (36.1)	79 (63.9)
Make funnies/play/laugh to ensure meals are enjoyable	7 (5.6)	116 (94.4)

In term of water treatment to make it safe for drinking, 85.3 % (n=116) believed the water was safe hence no need for further treatment, with only 10.3 % (n=14) of the respondents boiled the water at times. Other methods of water treatment included addition of aqua tabs 1.5 % (n=2), chemicals 0.7 % (n=1) and 2.2 % (n=3) used other methods.

All ECD centres (n=123) perceived vegetables were important for children to supplement vitamins and boost the immune system. Others, 2.4 % (n=3) mentioned that vegetables are vital in providing proteins, whereas 1.6 % (n=2) of the respondents thought vegetables provided energy.

Regarding views on parents whose children are malnourished, practitioners mentioned that it is a distressing situation to note that most of the parents were unable to recognize signs and symptoms of malnutrition while other parents are ignorant and disregard their advice not to give children “junk foods”.

3.4 Practices relating to food and nutrition provision and care of practitioners

3.4.1 Food preparation practices at the ECDs

Data in Table 3.4.1 revealed that 96.7 % (n=106) ECDs displayed inappropriate cooking methods for meat and vegetables. These methods included practices such as prolonged/ overcooking of vegetables for longer than 30 minutes, cutting raw vegetables before rinsing them in water, boiling and draining or throwing away excess water in vegetables while some boiled frozen chicken for 10-15 minutes as a method of defrosting, throw away the water and add fresh water to cook it properly.

Table 3.4.1 Methods used to cook leafy vegetables and meat at the ECD centres

Leafy vegetables	n (%)
Boil in water and oil for 10-20 minutes	4 (3.3)
Fry in oil for less than 5 minutes	3 (2.4)
Boil in water only for 10 -20 minutes	1 (0.8)
Others (prolonged boiling time and drain water from the food and throw it away)	115 (93.5)
Meat (chicken and beef)	
Cook at low heat 40 - 60 minutes	1 (0.8)
Grill/braai	3 (2.4)
Others (prolonged boiling time, drain water from the meat and throw it away)	119 (96.7)

3.4.2 Dietary quality of meals offered at the ECD centres using dietary diversity questionnaire

The total number of diet diversity forms (DDS) analysed differed (n=94), from the total number (n=123) used in the other analyses due to an unfortunate incident at Orange Farm. (Please see limitations section for more detail)

Table 3.4.2 shows that grain products were consumed at all ECD centres and 94% of ECD centres used fats and oils, but intake of fruit, vegetables, meat and poultry, and dairy products were much less and no eggs were used at all.

The dietary diversity score (DDS) for each ECD was calculated out of a possible nine (9) food groups. About fifteen percent (n=14) of the ECD centres analysed had low DDS, 61.7 % (n=58) had median and 23.4 % (n=22) high dietary diversity (DDS). Low consumption of the following foods was noted at some ECD centres; meat and fish (37.2 %, n=35) dairy products (30.9 %, n=29) and eggs 0 % (n=0).

Table 3.4.2 Overall consumption of food groups at ECD centres

Food group	ECD centres reported daily consuming n (%)
Grain	94 (100)
Fats and oil	88 (93.6)
Fruits	60 (63.8)
Vegetables	49 (52.1)
Vitamin A	43 (45.7)
Legumes and nuts	43 (45.7)
Meat poultry and fish	35 (37.2)
Dairy products	29 (30.9)
Eggs	none

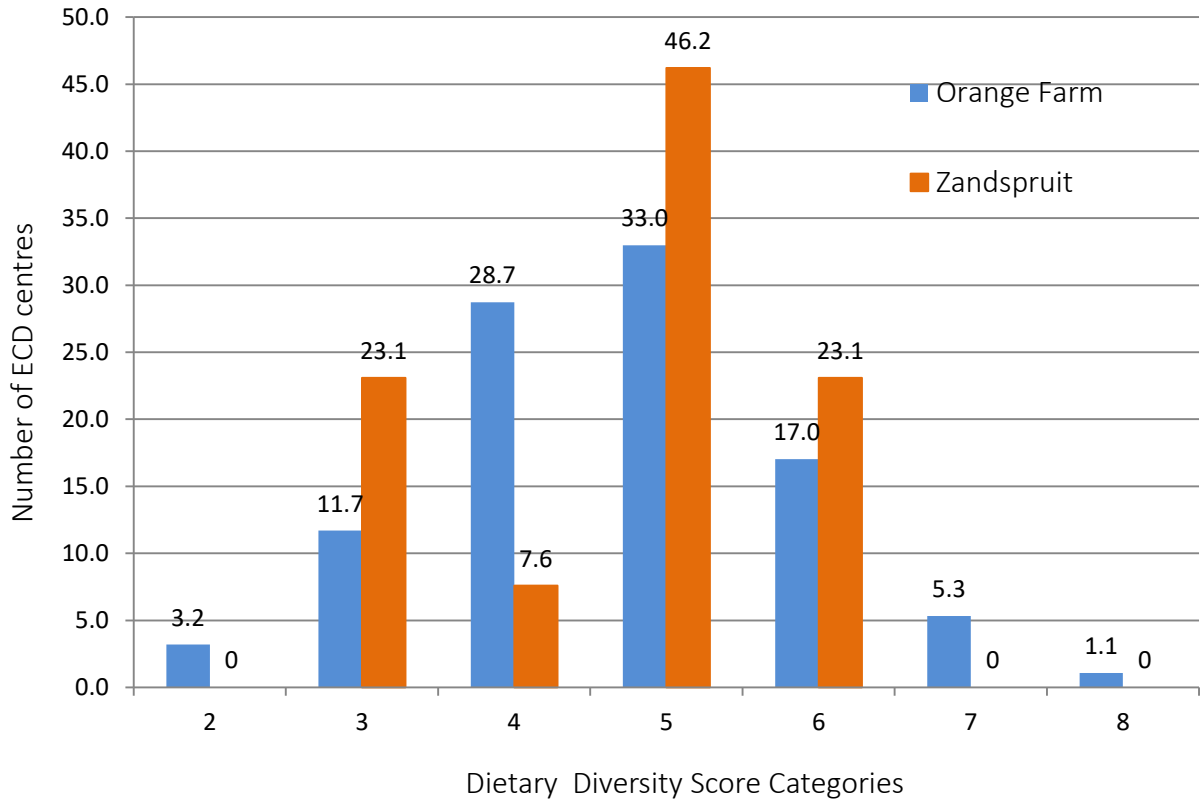
A nongovernmental organization working in the study areas provided a monthly food ration that included fortified corn soya blend/super cereal, mixed rice and lentils, dried/powdered milk, concentrated fruit juices and fruits. With the inclusion of food donations, 43.6 % (n=41) ECD centres (Zandspruit, n=14 and Orange Farm, n=27) were classified in the high dietary diversity category.

The fats/oils provided to the children were in the form of unsaturated cooking oil that was used to prepare relish/soup. None of the ECD centres used saturated spreads (margarine/butter) on bread as they had learned during the training that they are not good for children, therefore, most mentioned using peanut butter as an alternative. The importance of fruits in the diet was well comprehended with 86.2 % (n=106) of ECDs at times purchasing fruits and giving them to children. Fruits commonly eaten were apples (99.1 %, n=105), bananas (88.7 %, n=94), oranges (62.3 %, n=66), pears (19.8 %, n=21), peaches (9.4, n=10) avocados and granadillas (1.8 %, n=2).

At all the ECD centres all children, 6 - 60 months old, received the same diets, but the portion sizes differed, and for the children between 6 and 9 months certain foods were mashed. ECD centres in Zandspruit provided a significantly (p=0.003) more diversified diet than those in Orange Farm. The mean DDS values were 4.83 in Zandspruit (n=14; SD=1.030) and 4.67 in

Orange Farm (n=80; SD=1.223) respectively as shown in Figure 3.4. The overall DDS score was 4.69 (n=94, SD= 1,201). In Orange Farm, 11.9 % (n=13) of the ECD centres were the recipient of subsidies while in Zandspruit none of the centres received. ECD centres that were recipients of subsidies had significantly higher dietary diversity scores (DDS) compared to non-funded centres (p=0.008).

In Zandspruit, 71.4 % (n=10) of the practitioner/s instructed parents to give children fruits in season daily when they come to the ECD centre. The practitioner/s then put fruits in one basket and shared them equally among the children during snack time. These centres teach children important concepts of sharing and loving one another. Children from poor families who do not bring along fruits are not segregated since they also get their share of fruits from the basket.



DDS interpretation: -≤ 3 Low dietary diversity, 4 - 5 Median dietary diversity and ≥ 6 High dietary diversity

Figure 3.4 Comparison of dietary diversity score in research areas

Results showed a significant association between the number of meals offered at the ECD centres (n=94) and the dietary diversity score (p=0.003). There was no significant difference between dietary diversity score and availability of a food garden (p=0.821).

3.4.3 Time Spent at the ECD centres

The time children spent at the ECD centre daily was more in Zandspruit centres, which opened for longer hours (12 hrs) when compared to 9 hrs in Orange Farm, $p < 0.0001$ (Table 3.4.3). The mean time children spent at the ECD centres was 9.62 hrs, and both the median and mode was 9 hrs and the range 8 to14 hrs.

Table 3.4.3 Operating hours of ECD centres in Orange Farm and Zandspruit

Amount of time spent daily at ECD centre in hrs	8	9	10	11	12	13	14
Orange Farm n (%)	4 (3.7)	79 (72.3)	18 (16.5)	2 (1.8)	3 (2.8)	1 (0.9)	2 (1.8)
Zandspruit n (%)	0	0	0	7 (50)	7 (50)	0	0
Overall n (%)	4 (3.3)	79 (64.2)	18 (14.6)	9 (7.3)	10 (8.1)	1 (0.8)	2 (1.6)

3.4.4 Resources to support practices relating to education offered by practitioners

The most common information, education and communication (IEC) materials available in ECDs were posters (47.2%, n=58) and books (39%, n=48) as reflected in Table 3.4.4.1. If an ECD centre had nutrition IEC materials, researchers asked to see the various IEC materials available and inquired who provided them. Almost half of ECDs (47%, n=58) purchased IEC materials from bookshops. Orange Farm had more centres 86.4% (n=94) than Zandspruit 50% (n=7) with integrated nutrition activities in the curriculum of the ECD centres for the age group 36-59 months (p=001).

Table 3.4.4.1 Nutrition IEC resources available in ECD Centres

		Available n (%)	Not available n (%)
Nutrition IEC resources	Posters	58 (47.2)	65 (52.8)
	Pamphlets	19 (15.4)	104 (84.6)
	Books	48 (39.0)	75 (61.0)
	Nutrition corner	9 (7.3)	114 (92.7)
	Nutrition puzzles	21 (17.1)	102 (82.9)
	Others	25 (20.3)	98 (79.7)

IEC – Information education and communication

3.4.4.1 Practices relating to meals offered at ECD centres

The results show that 75.6 % (n=93) of the ECD centres gave 2 meals per day to the children, followed by 23.6 % (n=29) with 3 served meals and 0.8 % (n=1) with 4 meals served. Furthermore, 63.4 % (n=78) of the ECD centres rely on school fees as income to purchase food for the children, with 10.6 % (n=13) relying on subsidies, 25.2 % on donors (n=31) and 0.8 % (n=1) from others sources. About hundred and four (84.6%) of the ECD centres had planned menus and 80.5 % (n=99) of them displayed their menu on the kitchen walls. Only 64.2 % (n=79) of the centres always follow the menus, while, 35.8 % (n=44) said they did not, due to a number of challenges. Challenges included parents not paying fees on time, waiting for special discounts in shops to purchase cheaper foods, some ingredients not being available in local markets, delays in receiving subsidy and donations while some cooks failed to calculate and provide the right portion sizes resulting in over expenditure on budgeted food for the month.

Staple food popularly fed to child fed in Orange Farm and Zandspruit was “pap” (maize porridge) at 84.6 % (n=106), potatoes at 8.9 % (n=11) and 6.5 % (n=8) rice. The usual method of preparing the staple food was boiling (n=123) and normally served with sour milk and a small portion of minced beef, chicken, tinned fish, beans, soy mince and vegetables. Pork was not included in the menu planner of any of the ECDs. A significant difference was found between types of staple food fed to children in this study, as “pap” was mostly included in meals in comparison to potatoes and rice (p=0.033).

Table 3.4.4.2 Staple food fed to children

Study area	Potatoes % (n)	Pap % (n)	Rice % (n)	P-value
Orange Farm	10.1 (11)	85.3 (93)	4.6 (5)	
Zandspruit	0	78.6 (11)	21.4 (3)	p= 0.033
Overall	8.9 (11)	84.6 (104)	6.5 (8)	

The language spoken by practitioners had a significant effect on the choice of staple foods (Table 3.4.4.3) fed to children (p<0.0001). Zulu 87.5 % (n=42) and Sesotho speaking ECDs 85.5 % (n=47) mainly fed pap to children and Tswana 57.1 % (n=4) fed rice. Being a recipient of subsidy had no significant association with choice of staple foods fed to children (p=0.066), knowledge of malnutrition (p=0.176) or qualification of practitioner/s (p=0.586).

Table 3.4.4.3 Cross-tabulation of language and staple food

Language	Potatoes % (n)	Pap % (n)	Rice % (n)	Total % (n)	P-value
Xhosa	0	100 (7)	0	5.7 (7)	
Sesotho	12.7 (7)	85.5 (47)	1.8 (1)	44.7 (55)	
Tsonga	0	100 (1)	0	0.8 (1)	
Venda	0	100 (1)	0	0.8 (1)	<0.0001
Tswana	14.3 (1)	28.6 (2)	57.1 (4)	5.7 (7)	
Zulu	6.25 (3)	87.5 (42)	6.25 (3)	39 (48)	
Others	0	4	0	3.3 (4)	

Only 47.2 % of practitioners had heard about exclusive breastfeeding and yet none promoted it. Findings revealed that 50.4 % (n=62) of the ECD centres had children less than 6 months old at the time of the study. Of these, about 46.8 % (n=29) were introduced to solids earlier than 6 months old.

Table 3.4.4.4 Introduction of solid foods at ECD centres

Age of children (months)	Number of ECD centres feeding solids (n)	Percent (%)
1	7	11.3
2	5	8.1
3	3	4.8
4	4	6.5
5	2	3.2
6	8	12.9

3.4.5 Sanitation in ECD centres

In general, 93.5 % (n=115) had toilet facilities and only 6.5 % (n=8) did not have toilets. For the centres that had toilets, data shows that 93 % (n=107) of the centres had flush toilets, while 4.3 % (n=5) was a pit with slab and 2.6 % (n=3) had bucket latrines. Results illustrated in Table 3.4.4.5 show that the majority of children, 25.2 % (n=31) in ECD centres were washing their hands in basins and 68.3 % (n=84) in running water without soap. About 14.3 % (n=2) Zandspruit ECD centres had challenges in accessing potable water, 21.4 % (n=3) did not have toilets and 35.7 % (n=5) disposed of rubbish in undesignated space as centres.

Table 3.4.4.5 Water and sanitation situation

	Water source at ECD		Toilets in ECD centres		Refuse disposal		
	Piped water at centre (tap)	Public tap	available	unavailable	Rubbish pit	Undesignated open space	Municipality collected bins
Orange Farm	99.1 % (n=108)	0.9 % (n=1)	95.4 % (n=104)	4.6 % (n=5)	7.3 % (n=8)	0	92.7 % (n=101)
Zandspruit	85.7 % (n=12)	14.3 % (n=2)	78.6 % (n=11)	21.4 % (n=3)	7.2 % (n=1)	35.7 % (n=5)	57.1 % (n=8)
p-value	0.002		0.014		<0.0001		

The results of this show that 92.7 % (n=114) of the participants had heard about diarrhoea, with only 42.3 % (n=52) having received training in diarrhoea management compared to 57.7 % (n=71) who had not received it. About 17.1 % (n=21) of the ECD centres reported that they had children at one point suffering from diarrhoea. The findings related to sanitation and hygiene practices are summarised in Table 3.4.5.6, with 92.4 % (n= 109) of participants

reporting that they gave children salt and sugar solution as a remedy for diarrhoea, whilst 22.9 % (n=27) took the children to health facilities. Other practices such as the 1.7 % (n=2) participants gave the children herbal remedy, and 3.4 % (n=4) administered medicine bought at a pharmacy, also occurred. The researcher and his 3 research assistants also observed that all the potties seen at ECD centres were not covered and thus flies enter and leave freely, and could act as vectors in spreading diarrheal diseases to children's food during meal times. Many ECD centres used potties for little children; a number of children used one potty several times before they emptied it, which is a poor and unacceptable sanitation practice.

Table 3.4.4.6 Sanitation and hygiene practices

Diarrhoea prevention strategies	n (%)	Diarrhoea management/remedies	n (%)
Safe food preparation	15 (93.5)	Given salt and sugar solution	109 (92.4)
Children wash hands before eating food	7 (54.5)	Treat at the health centre	27 (22.9)
Children wash hands before using the toilet	9 (56.1)	Given herbal remedies	2 (1.7)
Dispose of stools in toilet	9 (15.4)	Bought medicine at pharmacy	4 (3.4)
Use water from protected sources	2 (26.0)	Sought spiritual help from Pastor	1 (0.9)
Use clean dishcloth	0 (16.3)	Didn't offer help to child at the centre	4 (3.4)
		Other treatment regime/protocol	9 (7.6)
Hand washing reasons		Hand washing process	
Before and after eating	122 (99.2)	In a basin	84 (68.3)
After coughing	31 (25.2)	Under running water	31 (25.2)
Only when dirty	4 (3.3)	With soap in a basin	18 (14.6)
After visiting toilet	99 (80.5)	With soap under running water	17 (13.8)
Wash for other reasons	8 (6.5)	Other methods	16 (13.0)

* Diarrhoea management responses, n=118 ECDs, 5 ECDs responses missing

3.4.6 Monthly school fees

The results in Table 3.4.6 show significant differences in school fees charged in ECD centres in the formal (Orange Farm) versus informal (Zandspruit) settlements (p<0001). School fee was inversely proportional to the age of children e.g. the fee for infants is more that that for toddlers at all the ECD centres. Zandspruit ECD centres apparently charged higher fees for all their age groups when compared to the same age groups in Orange Farm with average payments of R293 and R203.1 respectively.

Table 3.4.6 School fees charged monthly

Average fee charged in Rand (ZAR) per age group (months)	0-6	7-23	24-35	36-47	48-60	Average (ZAR)
Orange Farm (n=109)	253.6	211.10	187.98	179.08	183.7	203.1
Zandspruit (n=14)	323.57	312.86	277.14	275.7	275.7	293

ZAR – South African Rand denomination

3.4.7 Fuel source used at ECD centres

Most of the ECD centres used electricity 74.8 % (n=92) to prepare meals, followed by 17.9 % (n=22) using gas, 5.7 % (n=7) using paraffin and others (wood) 1.6 % (n=2).

3.5 Relationships between demographic information of practitioners and their nutrition knowledge and practices

A significant linear association was observed between the number of meals given and subsidy or amount of school fees charged monthly (p=0.026). ECD centres receiving subsidies or charging a higher fee, fed more meals to children compared to ECD centres that were charging the least fees and did not receive a subsidy.

Zulu, Sesotho, Xhosa and Tswana languages had more local terms for malnutrition, but this did not have a significant effect on the knowledge score of malnutrition (p=0.277). The main language spoken was used also a proxy measure of cultural alignment which in turn affects behaviour and practices. In the study, there was no association of culture and methods used for cooking vegetables (p=0.940), cooking meat (p=0.131) and knowledge of malnutrition (p=0.086).

There was no association between the level of qualification of participants and knowledge of malnutrition, anaemia, refuse disposal preference (use of bins collected by municipality, open space or rubbish pits) and provisioning of toilets (p=0.189).

Choice of cooking methods (vegetables and meat) were not related to the qualifications and age of participants (p=0.561). There was a significant difference between designing and approving the menus, and the practitioner/s or principals responsible for these actions in Orange Farm and Zandspruit ECD centres (p <0.0001). In Orange Farm, 69.7 % (n=76) ECD centres mentioned principals designed and approved the menus whereas, in Zandspruit, 64.2

% (n=9) mentioned that it was done by others. There was a positive association between highest level of qualification versus designing and approving menus in ECDs ($p<0.0001$) e.g. those who had Matric + other certificates, diplomas and degrees were confident or actively involved in designing and approving their menu planners compared to practitioner/s with no formal qualification.

No significant relationship was found between qualification of practitioner/s, age, availability of nutrition curriculum and provision of IEC materials ($p=0.492$). A significant negative correlation was observed between the age of the respondents and the highest qualification observed ($p=0.028$), with the younger practitioners having higher qualifications. However, no significant difference was found between qualification and knowledge on information about malnutrition, signs and symptoms ($p=0.191$).

3.6 Challenges faced in ECD Centres

Results show that 88.6 (n=109) ECD centres were registered as NPOs with DSD, 10.6 % (n=13) had both the NPO and Certificate of registration as a place of care, which is mandatory to operate as an ECD centre. Eight (6.5 %) had no form of documentation to allow them to operate as an ECD centre. The type of registration of the ECD centres differed with settlement type, ($p< 0.0001$). Other than the general NPO certificate of registration, ECD centres in Orange Farm had additional documentation in place compared to ECDs in Zandspruit. The documents they had were either a conditional or standard certificate of registration or some ECD centres were working hard to acquire missing documents in-line with DSD regulations. All ECD centres (n=14) in Zandspruit were getting assistance from NGOs and none were receiving government subsidies. In Orange Farm 11, 9 % (n=13) centres were receiving Government subsidies and 33.9 % (n=37) food donations from NGOs.

There was no significant difference in implementation of vegetable gardens in Orange Farm and Zandspruit ECD centres, $p =0.190$. From the 123 ECD centres included in the study , only 37.4 % (n=46) of the centres had vegetable gardens. The main challenge that given as a reason for not establishing vegetable gardens in informal settlements was limited backyard space, yet residents in Orange Farm had enough space but did not have vast vegetable gardens. The centres raised challenges of the poor soils which are unsuitable for vegetable production hence they did not have viable gardens.

Eighty-two percent (n=101) believed that there are more children who are supposed to be in ECDs but due to some reasons, they are not, while 17.9 % (n=22) did not report the same. Practitioners reported a number of challenges that parents face to get children in ECD centres. Nearly 60% (58.6 %, n=102) kept children at home citing unaffordable school fees as the reason, whilst 34.5 % (n=60) thought ECD/ Grade Zero programmes were not important in the child's life and that a child can stay at home until ready to go to Grade 1. It was also mentioned that facilities are far for children 1.1 % (n=2); parents teach them at home 1.1 % (n=2) and that children are sick or malnourished 1.2 % (n=2).

3.6.1 Representativity of gender

The majority of practitioner/s were female, indicating that gender disparity exists in this important field of work. Only 4.9 % (n=6) male practitioners participated in the in-depth survey. This information was derived from data collected with the questionnaires, and 2 % (n=1) in focus group discussions.

3.7 Focus group discussions (FGD)

3.7.1 Demographics of participants

Five focus group discussions (FGD), 4 in Orange Farm (n=41) and 1 (n=10) in Zandspruit were conducted with a total of 51 participants. The majority of the FGD participants were female principals (n=50).

Table 3.7.1 Demographics of FGD participants

		Zandspruit	Orange Farm			
		FGD 1 n (%)	FGD 2 n (%)	FGD 3 n (%)	FGD 4 n (%)	FGD 5 n (%)
Gender	Male	0	0	0	1 (12.5)	0
	Female	10 (100)	8 (100)	12 (100)	8 (87.5	12 (100)
Designation	Principal	8 (87.5)	8 (100)	12 (100)	8 (87.5)	12 (100)
	Practitioner	2 (25)	0	0	1 (12.5)	0

*FGD – Focus group discussion

3.7.2 Aspects relating to knowledge identified in FGDs

All participants pointed out that malnutrition was a problem in the areas they were working and acknowledged that at one point they had malnourished children attending their ECDs. During the FGD sessions, participants in all groups were able to state all signs and symptoms of malnutrition, one at a time. When such children were identified, participants said they called parents to discuss the issue, though some parents were uncomfortable with the conversation and refused to cooperate. Once they had identified the root cause, they tried and helped wherever possible including increasing meal portion sizes at the ECD centre or giving them leftover food to consume at home. Participants mentioned that malnutrition is prevalent in the communities and ECD centres because of a lack of nutrition assessments, early detection and referral systems. The principals conducted home visits to understand the general living conditions of the enrolled children. All FGD participants mentioned that children who normally presented with malnutrition were enrolling for the first time and this condition subsided as the ECD centres fed them daily.

An NVIVO Word Cloud (Figure 3.7.1) was compiled from most frequently occurring words or concepts mentioned in FGDs. The sizes of words appearing in Figure 3.7.1 show their order of importance. At the core of the figure, we had the biggest words; ECD and children followed by other significant terms parents, community, malnutrition, nutrition and food. These outstanding terms combined with other smaller words appearing on the word cloud as well were used to interpret themes/insights coming out of the qualitative data. It is evident from the responses of the participants that the communities experience many social problems that put the children in the ECD phase of the lifecycle at risk for receiving optimal nurture and care.

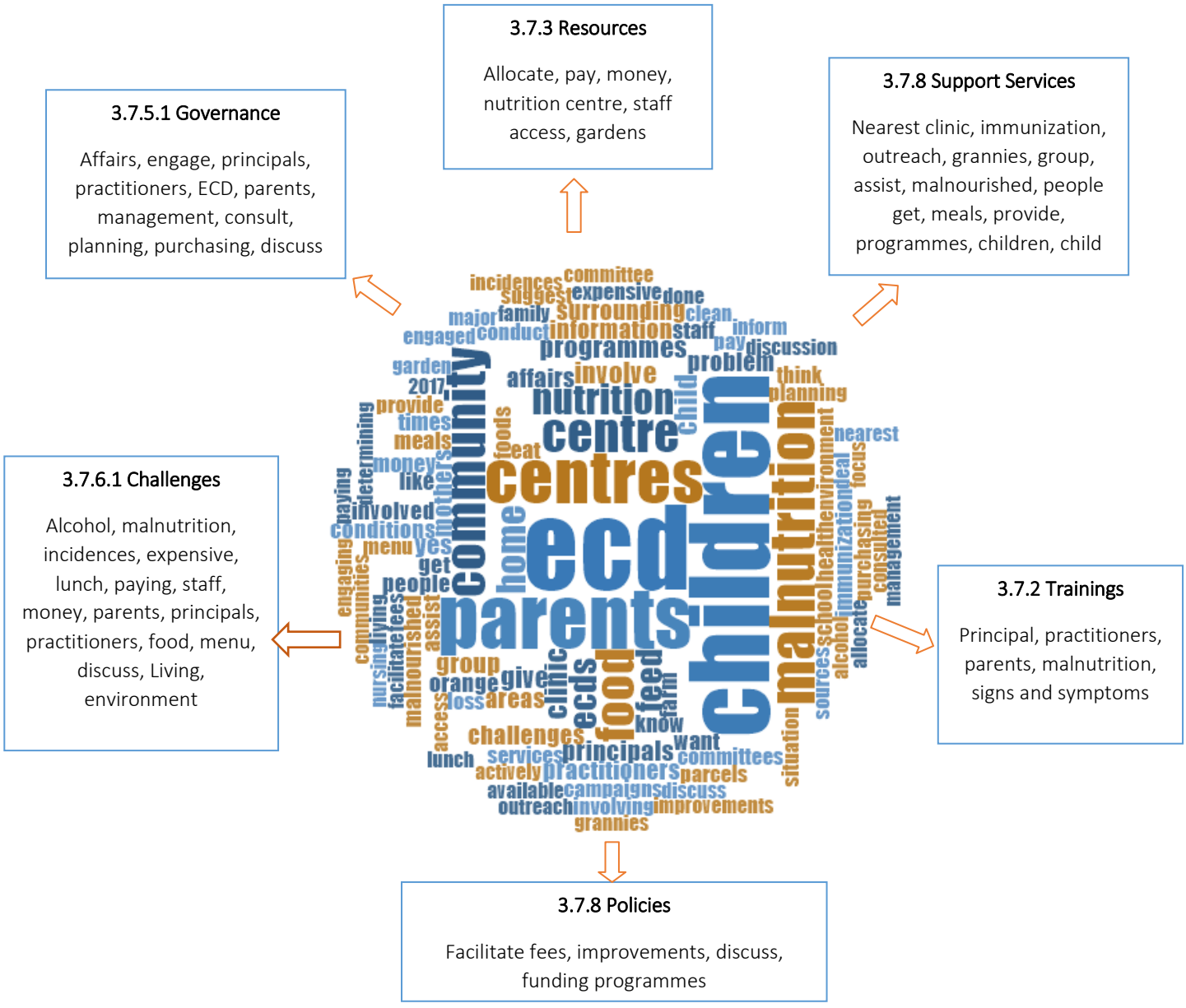


Figure 3.7.1 The NVIVO Word Cloud compiled from most frequently occurring words or concepts mentioned in FGDs

3.7.3 Access to nutrition resources to use in ECD centres

Principals and practitioners indicated that they do not have access to nutrition education information resources. Principals purchased nutrition posters and puzzles for kids to use. A few participants mentioned ECD centres had limited funding with over-reliance on NGOs is risky as most have conditional funding subjected to donor prescriptions. Most are

concentrating on distributing supplementary food or hampers and very little on capacity development. Nutrition education and health promotion are lacking in ECD centres in Orange Farm and Zandspruit.

3.7.4 Validity and reliability in-house training reported by practitioner/s

In Orange Farm where DSD was active, ECD centre practitioners attend training workshops frequently. The nutrition training content covered mainly menu planning activities, which emphasized that principals or practitioner/s should have a menu planner for each fortnight and should not serve the same menu on consecutive days. Figure 3.7.1.1 is an example of a menu planner in one of the ECD centres.

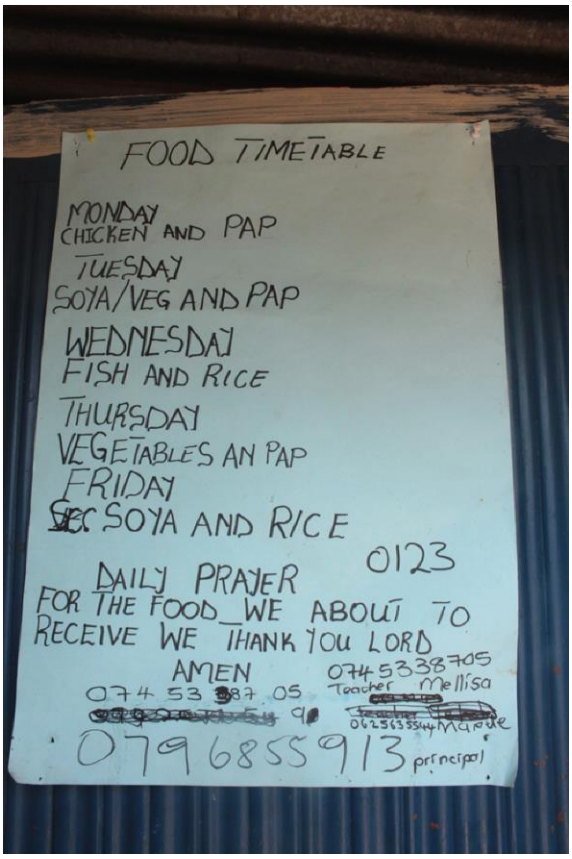


Figure 3.7.2 Menu planner displayed at Amogalang ECD centre in Zandspruit

3.7.5 Aspects relating to how practitioners perceive attitudes of parents identified in FGDs

Parents are not willing to pay more for school fees and this will consequently affect the quality of meals offered at ECD centres as part of the fees go to salaries for practitioner/s and administration. Some mentioned that parents presented a number of challenges to the ECD

centres, which included reluctance to participate in any ECD activity and failure to disclose child's chronic illness status making it impossible for principals to provide adequate support, and bringing children late in the morning after meal times have passed. Some parents misinformed centres on food allergies the child had in order to push ECD centres to give the child special meals beyond their reach.

3.7.5.1 Governance affairs in ECD centres

All five focus groups had mixed sentiments on the involvement of committees in ECD affairs. Almost 25.5% (n=13) % of the ECD centres had no committees compared to 74.5 % (n=38) that had. Participants were quoted saying:

> "After some parents who were in committees had seen cash flows at the ECD centre, they started demanding that ECD centre replicate their menus at home or include expensive foods on the menu yet others are unable to pay school fees on time to enable us to purchase adequate food". (FGD 3/ Facilitator: Tsotetsi)

Some parents do not settle school fees in arrears and complain a lot about general ECD affairs. As a result, participants mentioned sidelining parents in ECD affairs and menu planning an issue they are quite aware it's contrary to the DSD policies of compliance.

> "ECD centres are given extra responsibilities to look after other people's children just because they are paying school fees". (FGD 1/ Facilitator: Tsotetsi)

All participants repeatedly pointed out that parents' perceptions on nutrition would change if education targets special events in ECD centres such as Culture Day or community gatherings to deliver key nutrition messages.

ECD centres in Orange Farm (80.5 %, n=33) and all in Zandspruit (100 %, n=10) reiterated that they had many younger children in the streets than in centres.

> "Parents are ignorant; they do not value early childhood development" (FGD 2/ Facilitator: Kgati)

3.7.6 Aspects relating to parents' behaviour identified in FGD

ECD practitioners often do not meet some children's parents as siblings accompany little ones to centres. Some parents do not prepare breakfast for children, convinced that ECD centres will provide all meals from the school fee they are paying. Participants expressed anger over parents' behaviour of "dumping" their children in ECD centres and expecting them to look into every aspect of child caring responsibilities including areas that need parental roles such as bathing the child. During FGDs it was mentioned that ECD centres experience problems with the behaviour of some parents, who transfer children monthly from one centre to another until the year ends in a bid to avoid paying school fees.

> "Some parents are cunning; they transfer their children monthly from one ECD centre to another throughtout the year inorder to evade paying school fees. I would like to rebuke this common behaviour facilitated by some of our colleagues, the principals, who love money and accept such children without asking for references from the previous or neighbouring ECD centres" (FGD 4/Facilitator: Majaha)

3.7.6.1 General challenges

FGD participants (n=51) reiterated that conditions contributing to malnutrition in the community or ECD centres were poor behaviours such as poor sanitation, drug abuse and excessive consumption of alcohol during pregnancy leading to the birth of a child with foetal alcohol syndrome. Underage conception/ teenage pregnancies were mentioned as well contributing to undernourished babies. Promiscuity in the informal settlement, Zandspruit, fuelled mother-to-child-HIV-transmission during pregnancy and birth. Other contributing factors to malnutrition were the absence of adequate childcare in a situation where they are staying with elderly caregivers, child-headed households and children not attending ECDs.

> "Some parents are unemployed, children come to ECD barefooted". (FGD 3 / Facilitator: Tsotetsi)

Most of the household where the children come from are poor and food insecure. Some caregivers are ignorant; they are not worried to see that their children eat healthily. Some practitioners save money by employing poor feeding practices such as over dilution of foods to feed more children and by giving children spoiled foods. Subsidies are too little to support

social amnesties and at the same time cover fees for ECD centres. Most migrant families are struggling to survive or get decent accommodation.

> "If parents do not pay school fees in time, ECD is unable to being able to purchase food for the children towards month end as well as pay staff salaries". (FGD 2/ Facilitator: Kgati)

3.7.7 Issues causing certain practices identified at the ECD centres

FGD participants mentioned that beef is unaffordable and thus cook chicken most of the days to feed children. Suboptimal practices such as poor hygiene at home were noted at the ECD centres where some children do not change clothes, nappies or have a bath for days.

Food insecurity challenges were mentioned in many ECD centres since most of them charge very little school fees to cover meals and salaries for the practitioner/s. In Zandspruit, participants said most parents are employed in industries around the area and some go as far as Johannesburg town. It was relatively cheaper for parents to travel to work in town. It costs them R28 per day while in Orange Farm; participants said parents pay slightly more, R70 per day. In contrast, most parents in Orange Farm work in community development projects where they are paid meagre salaries on which they are unable to afford ECD services.

3.7.8 Complimentary support services provided to ECD centres

Nurses from the clinic in Orange Farm and Zandspruit conduct outreach programmes biannually to immunize children in ECD centres. DoH health teams also frequent visits to centres during National Immunization Days programme or increasing awareness during disease outbreaks. Ward based councillors and group of grannies club provide support in the form of take-home food packs and ready to eat meals for the malnourished children in Orange Farm.

3.7.9 Aspects of DSD funding for ECD centres

FGD raised issues with the current DSD policies that it is extremely difficult for struggling ECD centres to meet the requirements to get funding. ECD centres that are well built with good governance and qualified practitioner/s easily access the grants.

"They fund ECDs that have already made it in life" (FDG 3/Facilitator: Tsotetsi)

3.8 The anthropometric status of children 6-59 months attending ECD centres in Zandspruit and Orange Farm

A total of 431 children in 15 early childhood development (ECD) centres were assessed in Orange Farm and Zandspruit. In the study sample, boys and girls were equally represented, p = 0.494 as indicated in Table 3.8.1. Furthermore, significant differences (p< 0.0001) were seen in the age ratio (6-29 versus 30-59 months), with more children in the older range.

Table 3.8.1: Chi^2 statistical evaluation of sex and age ratios

Age group	Months	Boys	Girls	Total	Ratio Boys/Girls
6 to 17	12	15/43.4 (0.3)	17/40.4 (0.4)	32/83.8 (0.4)	0.88
18 to 29	12	34/42.3 (0.8)	25/39.4 (0.6)	59/81.7 (0.7)	1.36
30 to 41	12	39/41.0 (1.0)	45/38.2 (1.2)	84/79.2 (1.1)	0.87
42 to 53	12	71/40.4 (1.8)	57/37.5 (1.5)	128/77.9 (1.6)	1.25
54 to 59	6	28/20.0 (1.4)	30/18.6 (1.6)	58/38.5 (1.5)	0.93
6 to 59	54	187/180.5 (1.0)	74/180. (1.0)		1.07

Table 3.8.2 shows that malnutrition in all of its forms was found in this study and stunting had been the most prevalent nutrition disorder. In the total study population 3 children presented with Global Acute Malnutrition (GAM) and when GAM was assessed using Mid-upper arm circumference (MUAC) cutt-off point <115 mm, only one child was found to have GAM. The prevalence of overweight and obesity was 4.9% (n=21) and 1.2% (n=5) respectively. Table 3.8.3 shows the prevalence of the different forms of malnutrition in the two respective areas, Orange Farm and Zandspruit and statistical analysis to compare the two areas showed no significant differences between the two areas for stunting, GAM, GAM by MUAC (prevalence of children with MUAC < 125 mm), underweight, overweight or obesity.

Table 3.8.2 Prevalence of malnutrition all children 6-59 months old

Malnutrition indices	Children Assessed (n)	Children (n) <-2 SD	Prevalence at 95 % CI	Standard Deviation	Design effect (DEFF)
Stunting	359	96	26.7% (22.0-32.1 95% CI)	-1.21±1.43	1
GAM	431	3	0.7% (0.3- 1.8 95% CI)	0.22±1.02	1
GAM by MUAC	431	1	0.2% (0.0- 1.8 95% CI)	157.3±13.4	1
Underweight	360	32	8.9% (5.4-14.3 95% CI)	-0.57±1.17	1.85
Overweight	431	21	4.9 % (3.4 - 6.9 95% C.I.)		1
Obesity	431	5	1.2 % (0.4 - 3.4 95% C.I.)		1

*DEFF- Design effect
* GAM – Global acute malnutrition
*MUAC – Mid-upper arm circumference
*Stunting – z-scores were not available for 70 children, parents did not provide the date of births which were essential to calculate age, a component of HAZ and z- scores out of range were 2 as shown in Figure 3.8.1.
* Underweight – z-scores not available for 70 children and z-score out of range was 1.

Table 3.8.3 Prevalence of malnutrition in Orange Farm and Zandspruit

Area	GAM	Stunting	Underweight	Overweight	Obesity	MUAC (< 115 mm)
Orange Farm	0.5 (0.1-4.2)	24.9(15.6-37.2)	8.1 (3.9-16.1)	5.1(3.5-7.4)	1.9(0.5-6.7)	0.2(0 - 1.8)
Zandspruit	0.9 (0.3- 2.6)	28.5 (24.7- 32.6	9.6(4.1- 21.1)	4.6(2.1 - 9.7)	0.5(0.0-5.5)	0

*MUAC – mid-upper-arm circumference (< 115 mm)
* GAM – Global acute malnutrition
WHO classification of malnutrition is based on the following ranges; wasting acceptable 0-5 %, poor 5-10 %, serious 10-15 %, critical> 15 %.[24]

The comparison of the prevalence of malnutrition per gender in Orange Farm (formal housing) and Zandspruit (informal housing) as summarized in Table 3.8.4 also showed no significant differences for stunting, GAM, GAM by MUAC, underweight, overweight or obesity among boys and girls. No visible cases of Marasmus and Kwashiorkor manifesting as bilateral pitting oedema were identified during the anthropometric assessments.

Table 3.8.4 Comparison of anthropometric status of boys and girls (6-59 months) by area with predominant type of housing

	Total (n=431)		Formal housing Orange Farm (n=214)		Informal housing Zandspruit (n=217)	
	Boys (n=219)	Girls (n=211)	Boys (n=110)	Girls (n=104)	Boys (n=114)	Girls (n=103)
Wasting (WHZ ≤2SD)	0.9	0.5	0.9	0.0	0.9	0.1
Underweight (WAZ ≤2SD)	9.1	8.6	9.1	7.1	9.2	10.1
Stunted (≤-2SD HAZ)	28.6	25.0	24.7	27.1	32	24.7
Overweight (≥+2 SD WHZ)	2.2	2.4	6.4	3.8	6.1	2.9
Obesity (≥+3 SD WHZ)	0.4	0.5	2.7	1	0.9	0

*All the values are given as a percentage

WHZ – weight-for-height z-score

WAZ – weight-for-age z-score

HAZ – height-for-age z-score

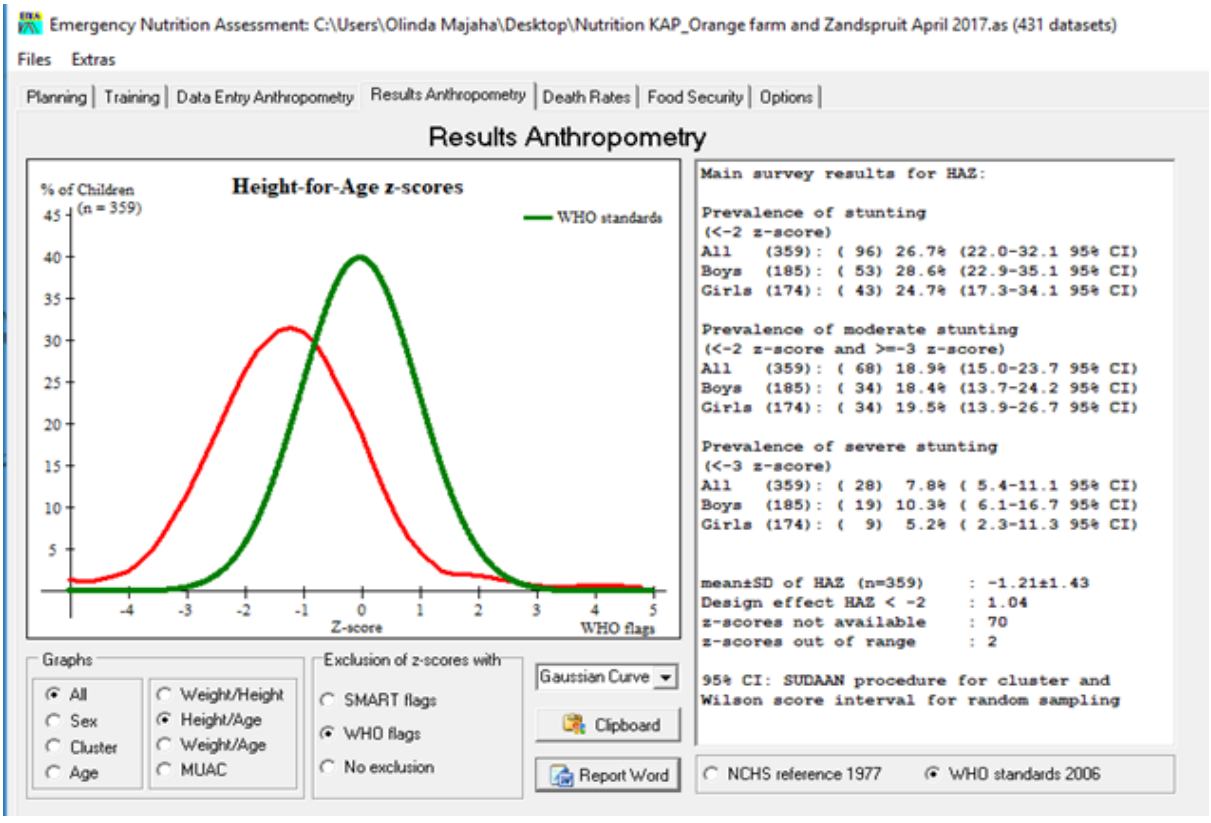


Figure 3.8.1: Height-for-age z-scores for children in ECDs as displayed from ENA 2011

Index of dispersion (ID) was used to test distribution of malnutrition cases in sampled ECD centres. The results showed that cases of lower scores for stunting (HAZ), wasting (WHZ) and

severe underweight (WAZ) were randomly distributed among the ECD centres (p<0.527) while moderate cases of stunting (HAZ) and underweight (WAZ) were aggregated into certain ECD centres (p<0001). Furthermore, it was found that wasting mainly affected the age group 54 - 59 months (Figure 3.8.3). The prevalence of HAZ, WAZ and WHZ was similar in study areas, only MUAC in Zandspruit was significantly lower when compared to Orange Farm (p=0.03). This study did not find children who were moderately or severely wasted/ malnourished using MUAC classification of 110 -125 mm.

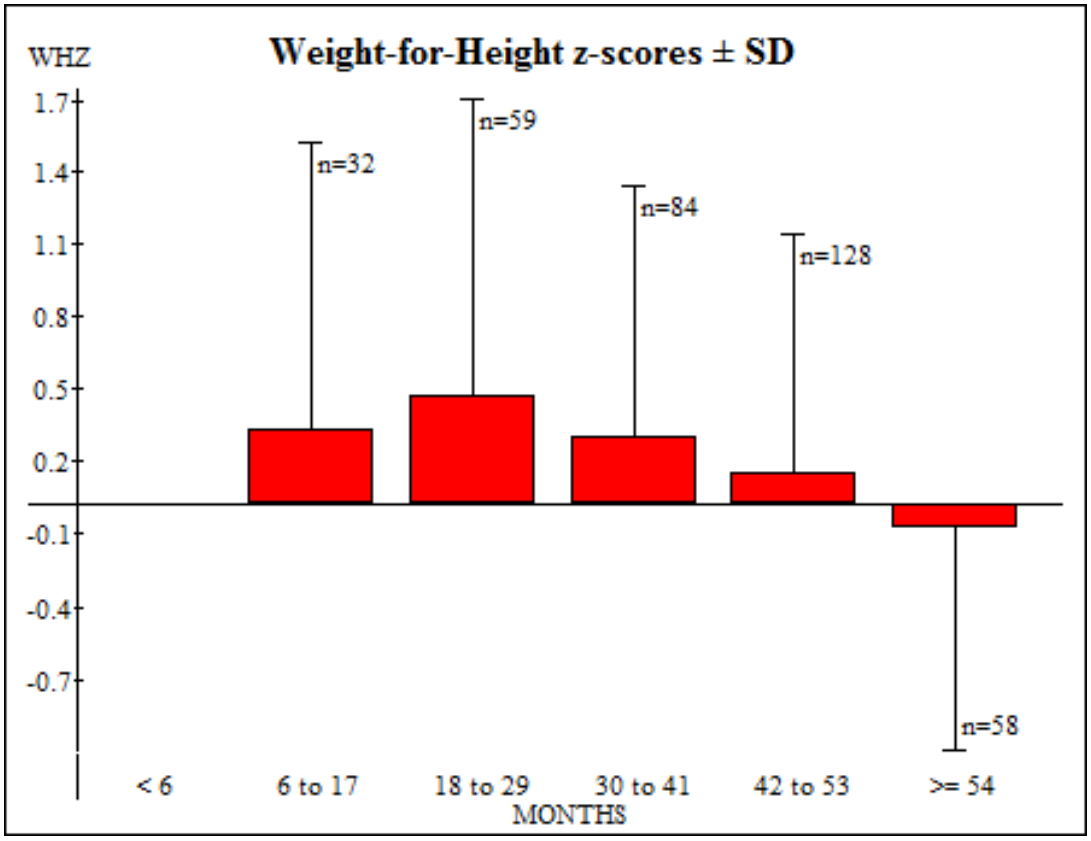


Figure 3.8.2 Wasting: Weight-for-height Z score (WHZ) by age group

CHAPTER 4

DISCUSSION

4 Discussion

The main objective of the study was to assess the nutrition knowledge and practices among practitioners in ECD centres in formal and informal settlements. The results show ECD practitioners had little knowledge on nutrition aspects assessed, as further discussed in subsequent sections.

4.1 Nutrition knowledge of the practitioners and FGDs

Practitioners showed an appreciation of the causes of malnutrition, as well as the signs and symptoms, and challenges in the community. Identification of growth faltering at the ECD is essential and many practitioners were unable to recognize micronutrient deficiencies and causes of oedema. Practitioners misunderstood severe wasting which they incorrectly named "Kwashiorkor" instead of Marasmus. Lack of knowledge on malnutrition, anaemia and water and sanitation clearly shows that training for early childhood development does not cover enough nutrition ground. This statement is reinforced by findings from the focus group discussions that DSD in-house training covered menu planning only.

There is a need to reinforce nutrition information and knowledge of ECD practitioners through skills training or peer-to-peer education. It is crucial to integrate nutrition education e.g. food preparation and storage in DSD training. This should certainly advance nutrition behaviour changes in ECD centres and reduce costs of funding individual nutrition intervention activities. An improved coordination, collaboration/synergy of activities between DoH, DSD, NGOs and ECD Forums is required to review the current training on nutrition provided to practitioners in the ECD training curriculum, as many struggle to develop proper menu planners. Little knowledge on anaemia implies the need to develop IEC materials and increase awareness campaigns on this public health problem. Practitioners are unaware that anaemia in childhood can have serious consequences such as increased mortality, growth restriction, heart failure and mental retardation later in life.[72]

The fact that practitioners reported in FGDs, that a greater proportion of the children not in ECD centres are the ones affected by malnutrition, is of concern, as this study found found a level of stunting similar to that reported in nationals studies conducted in South Africa.[24,25,34]

The practitioners reported that they observed and realised this only later at ECD centres, when parents enroll children to be ready for Grade R. An interesting perception from the FGDs was that ECD centres believed the ECD centres provided better meals than those provided by the parents, and thus the ECD centres help to improve the nutritional well-being of the child. Unfortunately, this hypothesis could not be validated as the study was only limited to ECD centres. However, results of children enrolment in centres and nutrition assessment showed fewer numbers of children 6-24 months in ECD centres, and this is part of the critical period in which stunting is known to occur. Children staying at home, often playing in streets, miss out on the ECD programme and consequently the necessary foundation for his/her cognitive, physical, social, psychosocial, and emotional and nutrition well-being to achieve the full potential in the first 5 years of the life.[4,5] The need to apprise parents on the benefits of enrolling children to ECD centres early, rather than keeping them at home, is evident. For parents who find services expensive, the alternative of home-based ECD centres is a possible option. In South Africa, home-based care centres have been found to be cheaper than the conventional ECD centres. The government fully supports this initiative for children not in ECD centres.[5,73] In Orange Farm, the issue of poverty is of concern, ECD centres in Orange Farm even lowered their school fees to match the standards of living of people in the area but parents failed to send children to preschool. More so, fee adjustments could have compromised the quality of meals offered hence low DDS for Orange Farm.

Inadequate nutrition knowledge of infant and young child feeding, malnutrition and anaemia continue to be the major challenge in many ECD centres. Those with NQF 4 and 5 had inadequate nutrition knowledge yet they still designed the menu planners that did not constitute a balanced diet hence they need assistance from the dieticians or nutrition professionals. The valuable initiative for each ECD centre to have a menu planner, which provides a nutritional diet, is a positive initiative of the Department of Social Development (DSD).[21]

There is a need to provide appropriate training to the practitioners and furthermore, nutrition education materials need to be distributed to ECD centres, clinics and community resources centres. In Orange Farm where DSD was active, ECD practitioners frequently

attend training workshops on administration, bookkeeping, compliance and emergency and first aid workshops. It is crucial to integrate nutrition education in such training as this will inevitability advance nutrition behaviour changes in ECD centres, therefore, reduce costs of funding individual nutrition and health promotion activities. Practitioners had heard nutrition information from various sources, therefore, it is important to recognize these channels for effective nutrition education and information dissemination which can be achieved through designing appropriate messages for the media, TV and radio, training/workshops, social platforms and community outreach programmes and distribution of pamphlets.

4.2 Attitudes regarding food and nutrition provision and care of practitioners

The small proportion of men who participated in the study show their involvement in childcare is lagging behind as very few provided support to ECD centres. Providing education to children in ECD settings is dominated by women workforce in many countries.[74] Issues of child caring are regarded worldwide as being the responsibility of women.[75] Men have been stigmatized in child care centres as outcasts i.e. men are not good childminders while other parents do not have faith in men to change baby girl diapers without abusing the child.[76] Other childcare studies refuted the above-mentioned beliefs, showing no differences between gender roles insensitivity, attention and stimulating interactions with children.[74,77] Men should be involved in ECD and child care activities as they serve as role models for boys.[75] Scholars argue that gender equality is an important aspect of ECD education as both men and women can act as role models that will assist to change the child's perception of gender as he/she grows.[74,76,77]

It was commendable to have centres encouraging children to eat during meal times and consume fruits. The approach allowed children to consume portion sizes they enjoy without being forced.[78] Some ECD practitioner/s had limited infant feeding knowledge, some forced children to eat during meal times, instead of encouraging them to eat or provide diversified meals for children. Studies revealed that force-feeding a child can lead to obesity, as the child cannot regulate his or her eating. This can lead or disorders such as anorexia or bulimia later in life and this negative practice consequently affects the child psychologically and emotionally.[79,80] If the child is refusing to eat, practitioner/s can give small frequent meals,

prepare different meals for each age group and diversified meals. Understanding nutrient needs for each age group throughout the life cycle is vital to ensure optimal nutrition for children.

During the focus group discussions, it was mentioned that ECD centres in Orange Farm lowered their school fees to match the standards of living of people in the area, but this adjustment consequently compromised the quality of meals offered as reflected in the mean dietary diversity score when compared to Zandspruit.

4.3 Practices regarding food and nutrition provision and care of study participants (practitioner/s)

All the ECD centres that were included in the study provided meals for children although the frequency varied and the parents never send children to ECDs with packed meals from home. It is highly commendable that practioners recognized that children are unable to pay attention and concentrate in class if they are hungry. However, the practitioners' inadequate nutrition knowledge could influence decisions that lead to poor dietary habits which in-turn could affect the nutrition well-being of preschool children.[81,82] Poor knowledge of optimal food preparation was visible in the proportion of practitioners that used inappropriate cooking methods. The question probed regarding cooking methods, sought to understand preservation of water and fat-soluble vitamins. Furthermore inappropriate cooking methods worsen the loss of essential vitamin B complexes in meat and vegetables, through leaching, hydration and evaporation hence participatory training in food preparation is critical.[83,84] In a study conducted by Atmore et al, they also noted lack of practical demonstration in training of ECD practitioner/s.[44] Vegetables and meat form an important part of our diet, inappropriate cooking methods also lead to losses of other nutrients such as proteins, Vitamin C, calcium, phosphorous, potassium and magnesium.[83,84] Therefore there is a need to determine the prevalence of micronutrient (Vitamin A, Iodine, Iron and Zinc) deficiencies in preschools in different regions.

In this study, only minced beef and chicken, and no pork was included in menu planners. Globally food forms an important part of religion, whereby believers follow certain rituals i.e. not consuming meat on certain days of the week, observing days like Passover and Lent, not

eating pork and consuming caffeinated drinks.[85] Other religious groups avoid consuming meats not slaughtered in particular manner as prescribed in their religious dogma. Religious practices could possibly contribute to low diversity scores noted and can also influence menu preferences[85] at ECD centres hence the need to train practitioners on the basics of menu planning and balanced diets to ensure centres provide diversified quality diets.

Practitioners had the misconception that stale/cold food cause malnutrition but the underlying factor is addressing issues of hygiene, food handling and storage. Food contamination could be a possible reason for morbidity reported on perceived signs and symptoms of malnutrition.

Practitioners used very little saturated fat, margarine and butter in their meals which is in line with the SA Food-Based Dietary Guidelines[86] and the proposed paediatric Food-Based Dietary Guidelines, that indicate to use fats sparingly.[86,21] The limited use of saturated fat, margarine and butter were mostly due to cost factors. These practices may help to decrease overweight and obesity risk factors for the development of metabolic syndrome, sleep disorders, cardiovascular diseases, diabetes and hypertension.[87] Obesity is a public health problem in the country, the prevalence rate in children aged 2-5 years is 18.1 %, 39.2 % in women and 10 % in men)[24] and therefore DoH has put policies and interventions in place for preschools and schools to halt the burden of obesity.[88] On the other hand, it might be valuable to add a bit of oil or butter to the food of a SAM child.

The contribution of vegetable gardens to dietary diversity to improve food and nutrition security in ECD centres are not realized.[89] There is a need to educate and motivate ECD practitioners regarding the value and benefits of establishing viable vegetable gardens throughout the year at their ECD centres. This will assist to improve the diet diversity at ECD centres in Orange Farm and Zandspruit if training is provided to ECD centres as well support such as seeds, fertilizer and manure.[89] City of Johannesburg municipality have policies to support the implementation of food security programmes in the urban household, and this can be extended to promote vegetable gardens in ECD centres.[89]There is a need to come up with viable sustainable strategies to support vegetable gardens in ECD centres especially from government, NGOs and private sectors.

4.4 Practices relating to education offered by study participants (practitioners) on IYCF

The study noted that ECD centres prepared meals guided by the planned menus wherever it was in place and were able to follow it daily. The increased knowledge on the menu and balanced diet constitution in Orange Farm ECD centres could be a result of frequent interaction with DSD community workers who reminded practitioner/s about general food diversification at the ECD centres compared to unavailability of such cadres in Zandspruit informal settlement. The provision of an already finalized planned menu in Zandspruit ECD centres by NGOs working with ECD centres disadvantaged the practitioner/s from learning and understanding the basic principles nutrition i.e. they failed to recall nutrients that constitute a balanced diet, which was already included on the menu planner they had received.

4.4.1 Sanitation

Most ECD centres had poor sanitation, refuse disposal and hand washing facilities. The sanitation challenges noted in Zandspruit were due to poor service delivery by City of Johannesburg municipality.[63] Because of inadequate sanitation practices and lack of information children are highly susceptible to diarrhoeal diseases/oral faecal ingestion which may accelerate stunting. This observation is supported by the recent research that ingestion of food contaminated with faecal matter causes inflammation of the bowl, leads to anaemia and in the long run, contributes to stunting.[90,91] The primary cause of faecal microbe ingestion is a lack of potable water, and poor sanitation and hygiene.[91] Interventions to curb the spread of diarrhoeal diseases are not effectively implemented in ECD centres, practitioner/s teaches the children to wash hands only after visiting the toilet, before and after eating, and lower percentage encouraging washing hands with soap. A study by Atmore et al in 2012 also found similar trends in use of potties and availability of flush toilets in ECD centres and the situation of sanitation challenges have not improved.[44]

SADHS reported diarrhoea and malnutrition were major causes of morbidity and mortality in children less than five years of age.[34]

4.5 Challenges faced in ECD Centres

It is extremely important to focus on the number of meals and quality of food provided at the ECD centre as the children are spending most of their time attending ECD centres than at

home. More hours spent at the ECD centre recorded in the study suggest that some parents even leave their children at ECD centres in the early hours of the morning going to work and fetching them upon returning later in the evening. As mentioned earlier, most ECD centres provide 2 meals and 2 snacks, which may be inadequate for the children who are spending so much time at the ECD centre thus may be susceptible to malnutrition. In South Africa, most ECD centres, regardless of funding, operate with a tight financial budget, where most of the money goes towards practitioners' salaries and therefore, quality of meals could be compromised.[92] Some ECD centres mitigate this situation by reducing the number of practitioners taking care of the children, thereby unintentionally increased practitioner/pupil ratio which may reduce the quality of care though it may depend on one's skills and attitude.[92]

The researcher noted the government's political commitment through DSD in assisting ECD centres and stakeholders with training; however, challenges remain in the qualification of ECD teaching practitioner/s, food security, accessing subsidy, water and sanitation. Not receiving a subsidy for all children at ECD centres is a major challenge that has been raised on many platforms.[92] The study reinforces issues raised in the DSD and UNICEF 2010 report on tracking public expenditure and assessing quality in early childhood development.[92] Furthermore, this signifies growing constraints on financial resources to adequately support ECD programmes within the country. This study reinforces previous studies that have shown that Government subsidies go a long way to improving the quality of meals at ECD centres. ECD centres that received subsidies were able to provide diversified and more meals to the children.[47]

ECD centres in Zandspruit and Orange Farm have a huge task to deal with it as far as malnutrition is concerned, with specific reference to stunting. Some of the contributing factors to the nutrition problems are entrenched in the community, such as ignorance to adequately care/feed the children, prioritizing spending money on alcohol instead of household food, poor hygiene and sanitation. To address issues of late detection of malnutrition, practitioners should receive training to conduct ECD based growth monitoring using MUAC and share information with DoH. This will help to detect faltering growth and assist in referrals thus prevent illnesses/deaths associated with malnutrition.[93]

4.6 Dietary quality of diets offered at the ECD centres

Vitamin A deficiency is one of the major public health problems in the country and consumption of vitamin A rich foods at the ECD centres was low. Vitamin A coupled with iodine and iron deficiencies are considered risk factors for physical, sensory and cognitive impairment.[21,24] This situation is worsened by lack of health promotion, nutrition education information and resource centres in communities. During the FGDs, ECD centres mentioned that beef and eggs were unaffordable hence the need to teach them about alternative economic sources of proteins. Educated participants recognized the importance of establishing vegetable gardens at their ECDs. However, they did not currently utilize vegetable gardens. The lack of knowledge regarding the need to provide diversified diets and gardening skills is a challenge identified. Issues emerging in FGDs show that parents as well ECD practitioners need to play a substantial role to ensure good nutrition at ECDs centres.

ECD practitioners were not aware of iron deficiency anaemia and could not recognize children with signs and symptoms. In a report on anaemia in South Africa, Visser and Herselman pointed out the need to increase public awareness on the aetiology of anaemia and the risks.[96] The SANHANES[25] and World Health Organization (WHO)[94] reports noted anaemia as a moderate public health problem in South African affecting children in preschools, women of reproductive age including pregnant mothers and the elderly.[25,94] While the causes of anaemia are many, nutritional deficiency due to inadequate dietary iron intake accounts for more than 50 % of the cases.[24,94] Significant improvement to reduce anaemia has been done by the government through fortification, deworming and iron supplementation.[24] These strategies alone are insufficient without promotion of food based dietary approaches to improve dietary diversification.[95] Vegetables gardens in ECD centres and households are essential as a low cost effective approach to increase supply iron rich foods.[95,96,97]

4.7 Anthropometric status of children 6-59 months attending ECD centres in Zandspruit and Orange Farm

The combined stunting prevalence of 26.7% reported in the study is similar to the 27 % figure reported in the recent SADHS and SANHANES studies. It is a known fact that stunting is endemic in South Africa. Unfortunately, there is not enough follow-through from national

and provincial levels to implementation level and capacity development to effectively address this situation.[24,45] It was noted that most respondents failed to distinguish forms of malnutrition commonly referring to Marasmus as Kwashiorkor, therefore, education and training is required in this regard. ECD caregivers can have a positive impact on nutrition if they receive appropriate training. A positive finding of this study is that the basic information practitioners had received in non-nutrition specific DSD training workshops, is being implemented effectively.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSION

5 Recommendations

Based on the findings noted in the Discussion chapter, the following recommendations are proposed;

1) All stakeholders (DoH, DSD and NGOs) should improve collaboration or coordination to support nutrition in ECD centres and extend funding to battling ECD centres in informal settlements
2) Nutrition behaviour change communication (BCC) strategies required in food preparation, cost-effective nutritious meals, and hygiene and food safety needs to be integrated into the existing ECD training which can be coordinated by DoH and DSD.
3) DoH and DSD need to review the basic ECD qualification curriculum for ECD practitioners (National Certificate for early childhood development, NQF L5) to include an in-depth component of nutrition and shift focus from theoretical training to design menu planners to the hands-on preparation of nutritious meals in poorly resourced ECD centres.
4) DSD and NGOs can establish outdoor ECD centres (an open space with shade net/tent/gazebo) in the community for children, not in ECD centres for parents who cannot afford school fees and educate other parents about the importance of ECD programmes from 2 years.
5) Department of Health (DoH) should undertake National micronutrient (Vitamin A, Iron, Iodine and Zinc) surveys in ECD centres and gather evidence to lobby funds for micronutrient intervention programmes.
6) All stakeholders (DoH, DSD and NGOs) should plan and implement intersectoral, viable nutrition interventions in ECD centres in both formal and informal settlements.
7) All stakeholders should train or build the capacity of ECD principals and encourage them to foster peer-to-peer nutrition education as some have elementary information.
8) DSD and NGOs promote inclusion of men in childcare and ECD programmes.
9) DoH should train ECD practioners/ community-based workers on malnutrition case identification, screening and referral.
10) All stakeholders should collectively improve nutrition and health promotion strategies in ECD centres and community.
11) DSD should advocate for ECD food vouchers as incentives to send children at home and not attending an ECD to ECD centres. ECD centres will redeem the voucher and get food

to feed the children. This was noted in the FGDs that provision of cash grants is subject to misallocation.

12) Department of Agriculture, Forestries and Fisheries (DAFF) should liaise with authorities to provide land for collective community ECD gardens. At harvest time ECD centres involved will share the produce and feed children. Community policing forum will assist in providing security of the garden all times.
13) DAFF need to promote and provide support for vegetable gardens in ECD centres.

5.1 Conclusion:

Based on these findings, similar to global evidence available, it is evident that severe acute malnutrition (wasting) is not a crisis in the country but endemic stunting is an emergency. Stunting in South Africa is a complex phenomenon and communities need a holistic approach to identify the drivers. ECD centres in their own capacities are unable to address the burden of malnutrition. Parents and stakeholders (DoH, DSD and NGOs) need to be involved in nutrition interventions aimed at improving the welfare of ECD centres. The improvement of nutrition knowledge and practices of ECD practitioners is recommended and revisiting the ECD training curriculum and allocation of funds for nutrition training for all ECD centres, including targeted behaviour change strategies, could lead to positive changes in the nutrition profile of ECD centres. DSD and DoH need to strengthen or accelerate implementation of ECD policies and continue creating supportive environments in which children can flourish.

5.2 Conflict of Interest: The study did not receive any funding. The principal researcher covered all related costs including providing the allowances for research assistants.

5.3 Study Strength: Study findings give us an essential working document/background/ general overview of nutrition gaps in early childhood development centres affecting Orange Farm and Zandspruit equally. Results also reviewed the inequalities in funding, support and service delivery from DSH and DoH existing between ECDs in formal (Orange Farm) and informal settings (Zandspruit).

5.4 Study Limitation:

The number of diet diversity forms (DDS) analysed was less (n=94), instead of 123 due to an unfortunate incident at Orange Farm. One of the research assistants was robbed during the research as she was walking in the streets in search for ECD centres to interview. The thieves got away with her handbag, a cellphone and the completed paper-based dietary diversity forms from 29 ECD centres. This incident did not affect the in-depth questionnaires which were already uploaded online.

There is a possibility that results may have been affected by interviewee recall error. For quality control purposes, the researcher removed the contribution from donations on the dietary diversity score, as some of these were inconsistent and would distort actual menu challenges centres are facing throughout the year. The researcher did not collect data to validate mortality and morbidity rate related to malnutrition and diarrhoeal diseases. During the questionnaire design phase, the principal researcher should have clearly distinguished knowledge, attitude, behaviour and practice questions to enable coherent data analysis and interpretation. Due to this understanding that became evident during data analysis and reporting it was decided to rephrase the topic and research question to align the the aim the study, the research tools and the study findings.

This study was confined to ECD centres, and the inclusion of other factors affecting the nutrition wellbeing of children emanating from the community could have added more value if stakeholders supporting ECD centres such DSD, DoH and NGOs were also included to participate in the data collection process.

6. REFERENCES

1. R J Hayes, S Bennett; Simple sample size calculation for cluster-randomized trials., *International Journal of Epidemiology*, Volume 28, Issue 2, 1 April 1999, Pages 319–326, [Online] https://doi.org/10.1093/ije/28.2.319 [2017, 28 November]

2. Swindale, Anne, and Paula Bilinsky. 2006. Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide (v.2). Washington, D.C.: FHI 360/FANTA. [Online] http://www.eldis.org/vfile/upload/1/document/0708/DOC19517.pdf [2017, 27 November]

3. Steyn NP, Nel J, Labadarios DL, Maunder EMW, Kruger S. Which dietary diversity indicator is best to assess micronutrient adequacy in children 1 to 9 y? Nutrition 30 (2014) 55–60. Online: http://www.nutritionjrnl.com/article/S0899-9007(13)00286-4/pdf [2018, 18 January]

4. L.G Irwin, A, Siddiqi, C, Hertzman. Early child development: a powerful equalizer. Final Report for the Commission on Social Determinants of Health. WHO, March 2007

5. Republic of South Africa. 2015. National Integrated Early Childhood Development Policy. Pretoria: Government Printers.

6. Save the Children Acute Malnutrition Summary Sheet. [Online] http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/Acute-Malnutrition-Summary-Sheet.pdf [2018, 21 January]

7. Cogill, Bruce. 2003. Anthropometric Indicators Measurement Guide. Washington, DC: Food and Nutrition Technical Assistance (FANTA) Project, FHI 360. [Online] https://www.fantaproject.org/sites/default/files/resources/anthropometry-2003-ENG.pdf [2017, 24 November]

8. Prado EL, Dewey KG. Nutrition and brain development in early life. Nutr Rev. 2014 Apr;72(4):267-84. doi: 10.1111/nure.12102. Epub 2014 Mar 28. [Online] https://www.ncbi.nlm.nih.gov/pubmed/24684384 [2017, 19 November]

9. Black MB, Walker SP, Fernald LCH, et al. Early childhood development coming of age: science through the life course. Lancet October 4, 2016 [0nline] http://dx.doi.org/10.1016/S0140-6736(16)31389-7 [2017, 25 November]

10. Collins S, Dent N, Binns P et al. Management of severe acute malnutrition in children. Lancet.2006; 368:1992-2000 [Online] http://dx.doi.org/10.1016/S0140-6736(06)69443-9 [25 November 2017]

11. Ulrich E Schaible, Stefan H. E Kaufmann. Malnutrition and Infection: Complex Mechanisms and Global Impacts. PLoS Med. 2007 May; 4(5): e115. doi: 10.1371/journal.pmed.0040115

12. Britto PR, Lye SJ, Proulx K, et al. Nurturing care: promoting early childhood development. Lancet October 4, 2016. [Online] http://dx.doi.org/10.1016/S0140-6736(16)31390-3 Accessed [2017, 25 November]

13. Consultative Group on Early Childhood Care and Development (CGECCD). Global Report on Equity and Early childhood. 2016. Consultative Group on Early Childhood Care and Development. [Online] http://www.ecdgroup.com/cg2/wp-content/uploads/2015/12/CGGlobal-FullReport-English-R2-WEB-LowRes.pdf [2017, November, 25]

14. Richter LM, Daelmans B, Lombardi J. Investing in the foundation of sustainable development: pathways to scale up for early childhood development. Lancet October 4, 2016 [Online] http://dx.doi.org/10.1016/S0140-6736(16)31698-1 [2017, 25 November]

15. Grantham-McGregor, Sally, et al., 'Developmental Potential in the First 5 Years for Children in Developing Countries', Lancet, vol. 369, no. 9555, 6 January 2007, pp. 60–70. [Online] https://www.ncbi.nlm.nih.gov/pubmed/17208643 [2017, 27 November]

16. Food and Agriculture Organization of the United Nations (FAO). A Primer to the Right to Adequate Food. The first Special Rapporteur on the right to food also introduced the emerging concept of food sovereignty claimed by civil society organizations (E/CN.4/2004/10, paras. 24–34) [Online] https://www.scribd.com/document/138282150/Right-to-Adequate-Food [2017, 28 November]

17. Hall, K, Sambu, W, Berry L, et al. (2016) South African Early Childhood Review 2016. Cape Town: Children's Institute, University of Cape Town and Ilifa Labantwana [online] https://www.health-e.org.za/wp-content/uploads/2016/05/SA-ECD-Review-2016-low-res-for-web.pdf [2017, 25 November]

18. Heckman, James J., 'Skill Formation and the Economics of Investing in Disadvantaged Children', *Science*, vol. 312, no. 5782, 30 June 2006, pp. 1900–1902. [Online] http://science.sciencemag.org/content/312/5782/1900 [2017, 25 November]

19. Shawar YR, Shiffman J. Generation of global political priority for early childhood development: the challenges of framing and governance. Lancet October 4, 2016 [Online] http://dx.doi.org/10.1016/S0140-6736(16)31574-4 [2017, 25 November]

20. United Nations Children's Fund. Inequalities in early childhood development: What the data say. New York, NY: UNICEF, 2012. [Online] https://www.unicef.org/lac/Inequities_in_Early_Childhood_Development_LoRes_PDF_EN_02082012(1).pdf [2017, 25 November]

21. Department of Health (DoH) 2016. Nutrition Guidelines for Early Childhood Development Centres, South Africa.

22. Black RE, Victora CG, Walker SP, et al. (2013) Maternal and child under nutrition and overweight in low income and middle-income countries. The Lancet, Vol 382(9890) pp 427-51 [Online] http://dx.doi.org/10.1016/S0140-6736(13)60996-4 [2017, 25 September]

23. Physical status: the use and interpretation of anthropometry. (1995) Report of a WHO Expert Committee. Technical Report Series No. 854. [Online] http://whqlibdoc.who.int/trs/ WHO_TRS _854.pdf [2017, 25 November]

24. Labadarios D, Editor. (2007) The National Food Consumption Survey: Fortification Baseline (NFCS-FB-1), Stellenbosch, South Africa. [Online] http://www.sajcn.co.za/index.php/SAJCN/article/view/286 [2017, 27 November]

25. Shisana O, Labadarios D, Rehle T, Simbayi L, Zuma K, Dhansay A, et al & SANHANES-1 Team (2013). South African National Health and Nutrition Examination Survey (SANHANES-1). Cape Town: HSRC Press. [Online]http://www.hsrc.ac.za/en/media-briefs/population-health/results-sanhanes1 [2017, 25 November]

26. Grantham-McGregor S, Cheung YB, Cueto S, et al. Developmental potential in the first 5 years for children in developing countries. Lancet 2007;369:60-70. [Online] Available: http://www.sciencedirect.com.ez.sun.ac.za/science/article/pii/S0140673607600324 [2017, 25 November]

27. Gray A, Vawda Y, Jack C. Health Policy and Legislation. In: Padarath A, English R, editors. South African Health Review 2012/13. Durban: Health Systems Trust; 2013. [Online] https://www.health-e.org.za/wp-content/uploads/2013/04/SAHR2012_13_lowres_1.pdf [2017, 29 November]

28. Katona P, Katona-Apte J: The interaction between nutrition and infection. Clin Infect Dis 2008;46:1582–1588 [Online] https://www.ncbi.nlm.nih.gov/pubmed/18419494 [2017, 29 November]

29. Aguayo VM, Nair V, Badgaiyan N, Krishna V. Determinants of stunting and poor linear growth in children under 2 years of age in India: an in-depth analysis of Maharashtra's comprehensive nutrition survey. Matern Child Nutr. 2016 May; 12(Suppl Suppl 1): 121–140. [Online] https://www.ncbi.nlm.nih.gov/pubmed/27187911 [2017, 21 November]

30. International Institute for Population Studies (IIPS) (2012) Comprehensive Nutrition Survey in Maharashtra. IIPS: Mumbai, India. [Online] iipsindia.org/pdf/DRreport1415.pdf [2017, 28 November]

31. United Nations, Department of Economic and Social Affairs, Population Division (2017). World Mortality Report 2015 (United Nations publication). ST/ESA/SER.A/381 [Online] http://www.un.org/en/development/desa/population/publications/pdf/mortality/WMR2015/WMR2015_Highlights.pdf [2017, 23 November]

32. United Nations Children's Fund (UNICEF), United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). Levels & Trends in Child Mortality Report 2015. UNICEF New York. USA. Available Online: https://www.unicef.org/publications/files/Child_Mortality_Report_2015_Web_9_Sept_15.pdf [2017, 14 August]

33. National Department of Health (NDoH). 2nd Triennial Report of the Committee on Morbidity and Mortality in Children under Five Years (2014) [Online] http://www.kznhealth.gov.za/mcwh/2nd-CoMMiC-Triennial-Report-2014.pdf [2017, 27 August]

34. National Department of Health (NDoH), Statistics South Africa (Stats SA), South African Medical Research Council (SAMRC), and ICF. 2017. South Africa Demographic and Health Survey 2016: Key Indicators. Pretoria, South Africa, and Rockville, Maryland, USA: NDoH, Stats SA, SAMRC, and ICF [Online] www.statssa.gov.za/publications/Report%2003-00-09/Report%2003-00-092016.pdf [2017, 16 November]

35. UNICEF, State of the World's Children, 1998. Oxford University Press, Walton Street, UK. [Online] https://www.unicef.org/sowc98/sowc98a.pdf [2017, 16 November]

36. UNICEF. (1990) Strategy for Improved Nutrition of Children and Women in Developing Countries. New York: UNICEF [Online] http://www.ceecis.org/iodine/01_global/01_pl/01_01_other_1992_unicef.pdf [2018, 18 January]

37. Hunt, J. M., (2005). The potential impact of reducing global malnutrition on poverty reduction and economic development, Asia Pacific Journal of Clinical Nutrition, 14, 10-38 [Online] http://apjcn.nhri.org.tw/server/APJCN/14/s/10.pdf [2017, 16 November]

38. Human Sciences Research Council. (2010). Western Cape Department of Social Development 2009 Audit of Early Childhood Development Facility Quality. South Africa: Human Sciences Research Council. [Online] https://www.westerncape.gov.za/text/2010/6/hsrc-qualitativeassessment-ecd-final_report-22-02-10.pdf [2017, 29 November]

39. United Nations, "Consensus Reached on New Sustainable Development Agenda to be adopted by World Leaders in September," 2 August 2015. [Online]. http://www.un.org/sustainabledevelopment/blog/2015/08/transforming-our-world-document-adoption/ [2018, 21 January]

40. Liu, L., Johnson, H. L., Cousens, S., Perin, J., Scott, S., Lawn, J.E., et al. (2012). Global, regional, and national causes of child mortality: An updated systematic analysis for 2010 with time trends since 2000. Lancet, 379 (9832), 2151–2161 [Online]

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)60560-1/fulltext [2017, 28 November]

41. Labadarios, D., Swart, R., Maunder, E.M.W., Kruger, H.S., Gericke, G.J., Kuzwayo, P.M.N., et al. 2008. Executive summary of the National Food Consumption Survey Fortification Baseline (NFCS-FB-I) South Africa. SAJCN, 21(3), 245-300. [Online] http://www.sajcn.co.za/index.php/SAJCN/article/view/286/281 [2017, 28 November]

42. Office of the United Nations High Commissioner for Human Rights (OHCHR), Adopted and opened for signature, ratification and accession by General Assembly resolution 44/25 of 20 November 1989 entry into force 2 September 1990, in accordance with article 49. Geneva, Switzerland, [Online] http://www.ohchr.org/Documents/ProfessionalInterest/crc.pdf [2017, 22 November]

43. Government of South Africa. The Constitution of the Republic of South Africa, 1996. (Act 108 of 1996) [Online] http://www.info.gov.za/documents/constitution/1996/96cons2.htm#35 [2017, 24 November]

44. Atmore E, Van Niekerk LJ & Ashley-Cooper M. 2012. Challenges facing the early childhood development sector in South Africa. South African Journal of Childhood Education | 2012 2(1): 120-139 [Online] http://www.scielo.org.za/pdf/sajce/v6n1/07.pdf [2017, 28 November]

45. Government of South Africa. Department of the Presidency. National Planning Commission (NPC). National Development Plan 2030: Our Future-make it work. [Online] https://www.gov.za/documents/national-development-plan-2030-our-future-make-it-work [2017, 27 November]

46. DOH, DSD & DPME. 2014. Summary evaluation report: Diagnostic/Implementation Evaluation of Nutrition Interventions for Children from Conception to Age 5. Khulisa Management Services (Pty) Ltd [Online] https://evaluations.dpme.gov.za/evaluations/441/documents/9a7cfb07-823a-42f9%20. [2017, 29 November]

47. Vorster, A., Sacks, A., Amod, Z., Seabi, J. & Kern, A., 2016, 'The everyday experiences of early childhood caregivers: Challenges in an under-resourced community', South African Journal of Childhood Education 6(1), a257. [Online] https://www.sajce.co.za/index.php/sajce/article/view/257/227 [2017, 29 November]

48. Shonkoff, J.P., Richter, L., Van der Gaag, J. & Bhutta, A., 2011, 'An integrated scientific framework for child survival and early childhood development', *Pediatrics* 129(2), e460–472. http://dx.doi.org/10.1542/peds.2011–0366. [Online] [2017, 22 November]

49. Bhutta ZA, Das JK, Rizvi A, et al: Evidence based interventions for improvement of maternal and child nutrition: what can be done and at what cost? Lancet 2013; 382:452–477. [Online] https://www.ncbi.nlm.nih.gov/pubmed/23746776 [2017, 22 November]

50. D. Mbithe, D. Kigaru, C Loechl, T Moleah, C.W Macharia-Mutie, Z.W Ndungu. Nutrition knowledge, attitude and practices among urban primary school in Nairobi City, Kenya: a KAP study, BMC Nutrition (2015) 1:44 [Online] https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-015-0040-8 [2017, 29 November]

51. Anju Aggarwal, Pablo Monsivais, Andrea J. Cook, Adam Drewnowski, Positive Attitude toward Healthy Eating Predicts Higher Diet Quality at All Cost Levels of Supermarkets J Acad Nutr Diet. 2014 Feb; 114(2): 266–272. [Online] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3947012/ [2017, 22 November]

52. Kathryn G. Dewey. The Challenge of Meeting Nutrient Needs of Infants and Young Children during the Period of Complementary Feeding: An Evolutionary Perspective. J Nutr 2013 Dec; 143(12): 2050–2054. [Online] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3827643/ [2018, 22 January]

53. WHO/FAO. Diet, Nutrition and the prevention of chronic diseases. Report of a Joint WHO / FAO Expert Consultation. WHO Technical Report Series. 2003;916:1-4. [Online] http://apps.who.int/iris/bitstream/10665/42665/1/WHO_TRS_916.pdf [2017, 28 November]

54. Schmidt MI, Duncan BB, Azevedo e Silva G, Menezes AM, Monteiro CA, Barreto SM, et al. Chronic non-communicable diseases in Brazil: burden and current challenges. Lancet. 2011;377 (9781):1949–61. [Online] https://www.ncbi.nlm.nih.gov/pubmed/21561658 [2017, 28 November]

55. WHO. The optimal duration of exclusive breastfeeding: report of an expert consultation. Geneva: World Health Organization; 2001. (WHO/NHD/01.09, WHO/FCH/CAH 01.24) [Online] www.who.int/nutrition/publications/infantfeeding/WHO_NHD_01.09/en [2017, 18 November]

56. Dewey KG, Brown KH. Update on technical issues concerning complementary feeding of young children in developing countries and implications for intervention programs. Food and Nutrition Bulletin. 2003; 24:5–28. [Online] https://www.ncbi.nlm.nih.gov/books/NBK148957/ [2017, 18 November]

57. Yvette Fautsch Macías, Peter Glasauer (2014) Guideline for Assessing nutrition-related Knowledge, Attitude and Practice, FAO Division Rome [Online] www.fao.org/docrep/019/i3545e/i3545e.pdf [2017, 29 November]

58. Consultative Group on Early Childhood Care and Development (CGECCD). Global Report on Equity Early Childhood. (2015) Featuring routes to promoting equity in the post-2015 agenda for sustainable development and promising case studies from around the world. Leiden, Netherlands [Online] http://www.ecdgroup.com/cg2/wp-content/uploads/2015/12/CGGlobal-FullReport-English-R2-WEB-LowRes. pdf [2017, 18 November]

59. World Health Organization (2010). Indicators for assessing infant and young child feeding practices part 2: Measurement. WHO Press, 20 Avenue Appia, 1211 Geneva 27, Switzerland. [Onine] http://www.who.int/nutrition/publications/infantfeeding/9789241599290/en/ [2018, 22 January]

60. Macías YF, Glasauer P. (2014) Guidelines for assessing nutrition-related Knowledge, Attitudes and Practices. FAO. [Online] http://www.fao.org/docrep/019/i3545e/i3545e.pdf [2018, 21 January]

61. Launiala A. How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi. Anthropol Matters. 2009:11. [Online] https://www.anthropologymatters.com/index.php/anth_matters/article/view/ 31/53 [2017, 21 November]

62. Blaauw R, Daniels L, du Plessis LM, et al. (2017) Assessing the utilisation of a child health monitoring tool. S Afr J Child Health 2017;11(4):164-169 [Online] DOI:10.7196/SAJCH.2017.v11i4.1326 [2018, 23 January]

63. Ronald Mears. (2011) Historical development of informal township settlements in Johannesburg since 1886.
Paper presented at the Economic History Society of Southern Africa, Conference, 10-12 September 2007, Indaba Hotel, Fourways, Johannesburg and at ERSA Research Workshop, 2 – 4 November 2011, Kopanong, Johannesburg [Online] https://econrsa.org/system/files/workshops/presentations/2011/mears-paper-ersa-2011.pdf [2017, 29 November]

64. City of Johannesburg. "Orange Farm, South Africa". City of Johannesburg, 11 July 2002. [Online] https://joburg.org.za/index.php?option=com_content&id=932&Itemid=52 [2017, 22 November]

65. Harvard University Humanitarian Initiative (2014). KoBoToolbox, Data Collection Tools for Challenging Environments. Harvard University. USA [Online] http://www.kobotoolbox.org/ [2015, 10 August]

66. Kennedy G, Ballard T, Dop MC. (2011) Guidelines for measuring household and individual dietary diversity. Nutrition and Consumer Protection Division, Food and Agriculture Organization of the United Nations [Online] http://www.fao.org/docrep/014/i1983e/i1983e00 [2015, 8 October]

67. Hoddinott, J, Yohannes Y. (2002) Dietary Diversity as a Household Food Security Indicator. Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development. Dietary diversity as a food security indicator. [Online] http://www.fantaproject.org/sites/default/files/resources/DietaryDiversity-HH-FS-Indicator-2002.pdf [2017, 29 November]

68. Labadarios D, Mchiza J.Z, Steyn N.P, Gericke G, Maunder E.M, David Y.D Parker W.D. Food security in South Africa: a review of national surveys. Bull World Health Organ 2011;89:891–899 [Online] [2017, 29 November]

69. Statistics South Africa. The South African National Census of 2011. Statistical release – P0301.4. Pretoria. Statistics South Africa, 2012 [Online] [2017, 29 November]

70. Emergency Nutrition Assessment (ENA) 2012. Software for standardized monitoring and assessment of relief and transitions (SMART). [Online] http://www.nutrisurvey.de/ena/ena.html [2017, 22 November]

71. McNiff, Kath "What is Qualitative Research?" *The NVivo Blog*. QSR International. QSR International Pty Ltd, (November 9, 2016). [Online] http://www.qsrinternational.com/nvivo/nvivo-community/blog/what-is-qualitative-research [2017, 27 November]

72. E.K Hurtado, A.H Claussen, and K.G Scott. 1999 Early childhood anemia and mild or moderate mental retardation. American Society for Clinical Nutrition. [Online] http://ajcn.nutrition.org/content/69/1/115.short [2017, 19 November]

73. Jonathan Carter, Linda Biersteker & Judith Streak (2008) Costing centre-based early childhood development programmes for children under age five: Case Studies from the Western Cape. MRCS. September 2008. [Online] https://www.gtac.gov.za/knowledge-products/research-repository [2017, 25 November]

74. Cristina Colonnesi, Marleenvan Polanen, Louis W.C. Tavecchio, Ruben G. Fukkin. Mind-Mindedness of Male and Female Caregivers in Childcare and the Relation to Sensitivity and Attachment: An Exploratory Study. Elsevier, April 2017 [Online] https://www.ncbi.nlm.nih.gov/pubmed/28554785 [2017,21 November]

75. WB Jorosi-Tshiamo, Keitshokile D Mogobe and Mosidi T Mokotedi. Male Involvement in Child Care Activities: A Review of the Literature in Botswana. Afr J Reprod Health 2013; 17[4]: 35-42 [Online] https://www.ncbi.nlm.nih.gov/pubmed/24558780 [2017, 22 November]

76. Doris. M. Martin, Frank W. Luth jnr. Where Are The Men? The Scarcity of Males in Early Childhood Classrooms. Journal of Early Childhood Teacher Education. Volume 21, 2000 - Issue 3 [Online] http://www.tandfonline.com/doi/abs/10.1080/0163638000210303 [2018, 21 January]

77. Marleen van Polanen, Cristina Colonnesi, Louis W. C. Tavecchio, Susanne Blokhuis & Ruben G. Fukkink. Men and women in childcare: a study of caregiver–child interactions. European Early Childhood Education Research Journal Vol. 25, Iss. 3,2017 [Online] www.tandfonline.com/doi/abs/10.1080/1350293X.2017.1308165 [2017, 22 November]

78. Kleinman R. Pediatric nutrition handbook. Chapter 7: feeding the child and adolescent. 5th ed. USA: American Academy of Pediatrics; 2004. p. 119–36. [Online] pediatrics.aappublications.org/content/pediatrics/115/2/496.full.pdf [2017, 22 November]

79. Faith Myles S, Scanlon Kelley S, Birch Leann L, Francis Lori A & Sherry Bettylou (2004) Parent-child feeding strategies and their relationships to child eating and weight status *Obes Res* **12**(11), 1711–1722 [Online] onlinelibrary.wiley.com/doi/10.1038/oby.2004.212/full [2017, 29 November]

80. Silvia Scaglioni*, Michela Salvioni and Cinzia Galimberti Influence of parental attitudes in the development of children eating behaviour. British Journal of Nutrition (2008), 99, Suppl. 1, S22–S25 [Online] https://www.ncbi.nlm.nih.gov/pubmed/18257948 [2017, 28 November]

81. Phometsi M, Kruger A, Van't Riet H. Nutrition knowledge and barriers to good dietary practices among primary school children in a farming community. Dev South Afr. 2006; 23 (4):529–39. [Online] www.tandfonline.com/doi/full/10.1080/03768350600927375?src=recsys [2017, 28 November]

82. Kostanjevec S, Jerman J, Koch V. Nutrition knowledge in relation to the eating behaviour and attitudes of Slovenian schoolchildren. Nutr Food Sci.2013;43(6):564–72. [Online] www.emeraldinsight.com/doi/abs/10.1108/NFS-10-2012-0108 [2017, 28 November]

83. Shahnaz Alvi, K. M. Khan, Munir A. Sheikh and Muhammad Shahid. Effect of Peeling and Cooking on Nutrients in Vegetables. Pakistan Journal of Nutrition 2 (3): 189-191, 2003 [Online] agris.fao.org/agris-search/search.do?recordID=DJ2012053043 [2017, 22 November]

84. Ahmad S. 1976, Nutrient losses in vegetable due to peeling and cooking. M. Sc. Thesis, Department of Nutrition, University of Agriculture, Faisalabad [Online] https://pdfs.semanticscholar.org/d212/61a1e034b525102590e6ae432b4a95770f4f.pdf [2017, 22 November]

85. K. Albala. Religious Customs, Influence on Diet .Encyclopaedia of Human Nutrition (Third Edition) Elsevier 2013, pages 153–157. [Online] https://doi.org/10.1016/B978-0-12-375083-9.00245-2 [2017, 22 November]

86. Vorster HH, Badham JB, Venter CS. An introduction to the revised food-based dietary guidelines for South Africa. S Afr J Clin Nutr 2013;26(3):S1-S164 [Online] http://sajcn.co.za/index.php/SAJCN/article/view/740/1105 [2018, 21 January]

87. Harrison K, Bost K. Toward a Developmental Conceptualization of Contributors to Overweight and Obesity in Childhood: The Six C's Model. Child Dev. 2011; 5(1):50–8. [Online] onlinelibrary.wiley.com/doi/10.1111/j.1750-8606.2010.00150.x/abstract [2017, 22 November]

88. Department of Health (2015)Strategy for the prevention and control of obesity in South Africa 2015-2020 [Online] https://www.health-e.org.za/2015/12/28/strategy-the-prevention-and-control-of-obesity-in-south-africa-2015-2020/ [2017, 29 November]

89. Pereira, L, M & Ruysenaar. S. (2012) Moving from traditional government to new adaptive governance: the changing face of food security responses in South Africa, Journal of Food Security [Online] https://www.researchgate.net/profile/Laura_Pereira4/publication/257788760_Moving_from_traditional_government_to_new_adaptive_governance_The_changing_face_of_food_security_responses_in_South_Africa/links/564445ac08aef646e6ca786b.pdf [2017, 29 November]

90. Rosie J. Crane, Kelsey D. J. Jones, and James A. Berkley Environmental enteric dysfunction: An overview Food and Nut Bulletin, 2015 [Online] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4472379/ [2017, 22 November]

91. Jean H. Humphrey, Andrew D. Jones, Amee Manges, Goldberg Mangwadu et al, The Sanitation Hygiene Infant Nutrition Efficacy (SHINE) Trial: Rationale, Design, and Methods. *Clinical Infectious Diseases*, Volume 61, Issue suppl_7, 15 December 2015, Pages S685–S702 [Online] https://academic.oup.com/cid/article/61/suppl_7/S685/358186 [2017, 22 November]

92. Department of Basic Education, Department of Social Development, South Africa/UNICEF (2010). Tracking public expenditure and assessing service quality in Early Childhood Development in South Africa [Online] https://www.unicef.org/southafrica/SAF_resources_pets.pdf [2017, 5 October]

93. Panpanich R, Garner P. Growth monitoring in children. Cochrane Database Syst Rev. 2000; (2):CD001443. Review. [Online] https://www.ncbi.nlm.nih.gov/pubmed/10796794 [2017, 22 November]

94. World Health Organization. Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia. Geneva: World Health Organization; 2008. [Online] http://www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/9789241596657/en/ [2018, 22 January]

95. Visser J, Herselman MG (2013). Anaemia in South Africa: the past, the present and the future, South African Journal of Clinical Nutrition 2013;26(4) [Online] http://www.sajcn.co.za/index.php/SAJCN/article/view/839/1094 [2018, 22 January]

96. B. Thompson (2014) Food-based approaches for combating iron deficiency. Food and Agriculture Organization (FAO), Rome, Italy [Online] ftp://193.43.36.92/ag/agn/nutrition/Kapitel_21_210207.pdf [2018, 24 January]

97. Laurie SM, Faber M, Maduna MM. (2017) Assessment of food gardens as nutrition tool in primary schools in South Africa. S Afr J Clin Nutr 2017;30(4):80–86. [Online] https://doi.org/10.1080/16070658.2017.1271609 [2018, 24 January]

ADDENDUM 1: QUESTIONNAIRE FOR ECD PRACTITIONERS

ASSESSING NUTRITION KNOWLEDGE, ATTITUDE, BEHAVIOR AND PRACTICES (KABP) IN EARLY CHILDHOOD DEVELOPMENT CENTRES IN ZANDSPRUIT AND ORANGE FARM, GAUTENG PROVINCE, SOUTH AFRICA.

Instructions: Circle the answers given and don't read/show answers to the respondents.

PROVINCE:	DISTRICT	ECD NAME:	RESPONDENT	DATE:	TIME:	REPORTED BY

1. BACKGROUND INFROMATION

1.2.1 What is the gender of the respondent? (Isini somupenduli)(Mbeu ya mufhinduli)(Moarabi e motona kapa e mosadi) (Ubulili bommangalelwa)	Gender 1 = Male 2 = Female (Mlinwaba yamuthinduli) (Dijara tsa moarabi) Age: (in years) .....
Respondent is ?(Umpenduli ngu)(Mufhinduli ndi)(Moarabi ke) (Ummangalelwa)	1= Principal 2=Staff Member 3=Board Member 4=Owner 5=Relative
1.0 When was the ECD established? (Savulwa nine esiziko sabatwana)(Creche yo thoma lini)(ECD ethomiie neng)	Number of years (Inani leminyaka) (Palo ea lilemo)(minyaka mingaki) .....
1.1 Is the ECD registered? I(ngaba esiziko sibhalisiwe kwaSocial Department) (Creche yo nwalisa naDept of Social) (ECD e ngolisitsoe) (Ingabe i-ECD ibhalisiwe) 1.1.1 If Yes type of registration? (Ukuba ewe, lokuphi uhlobo lobhaliso)(Asali yo nwaliswa, hani)(Haeba e, mofuta oa ngoliso) (Uma Yebo uhlobo lokubhalisa)	1 = Yes 2 = No NPO ☐ Partial Care ☐ Both ☐
1.1.2 Condition of registration (Imeko yobhaliso)(Boemo ba ho ngolisa)((boemo ba ho ngolisa) (isimo sokubhaliswa)	1. Standard 2. Conditionally 3. None
1.2.3 What is your highest qualification? (Ingaba Lithini Inqanaba eliphezulu lemfundo yo (lo) mpenduli)(Tshivalo tsha mufhunduli) (Thuto ea hao e phahameng ka ho fetisisa ke efe) (Iyini imfundo yakho ephakeme ezuziwe)	1. None 2. Matric 3. NQF L3 4. NQF L4 5. NQF L5 6. NQF L6 7. Others

1.3.0 What is your religion? (inkolo yompenduli)(Lutendo lwamuvhudziswa)(Bolumeli ba hau ke bofe) (Iyini inkolo yakho)	1. Catholic 2. Protestant 3. Hinduism 4. Judaism 5. Islam 6. Traditional African 7. Traditional African 8. No Religion
1.3.1 What is main language spoken? (Ingabo loluphi olona lwimi olithethanayo)(luambo)(Puo e kholo e buuoa ke eng) (Kuyini ulimi oluyinhloko olukhulunywa)	1. Zulu 2. Xhosa 3. Sesotho 4. Tsonga 5. Venda 6. Tswana 7. English 8. Others .....
1.4.0 Number of ECD staff? (Inanai Lwabasebenzi besini sobudoda)(Tshivalo tsha vashumi vha vhanna) (palo ea basebetsi) (Inani labasebenzi be-ECD) 1.4.1 Staff qualification? (Inanai Lwabasebenzi obangama bhinqa)(Tshivalo tsha vashumi vha vhafumakhadzi) (thuto ea basebetsi e fihlile)(Iziqu zabasebenzi)	Total..... Female..... Male ..... 1 = None 2 = NQF L 4 ..... 3 = NQF L5 .....
1.4.2 Was ECD staff trained in (Vashumi vhangana vho fundedzwaho ngaha mutakalo natsiredzoya zwiliwa) (Na basebetsi ba koetlisitsoe) (Ingabe abasebenzi be-ECD baqeqeshiwe) 1. Nutrition, hygiene & food safety 2. Management, leadership, administration and finance? 3. First aid and emergency plan?	1 = Yes 2 = No If Yes? No. trained ..... 1 = Yes 2 = No If Yes? No. trained ..... 1 = Yes 2 = No If Yes? No. trained .....
1.4.3 Number of registered children? (Inanai labatwana aba kwesiziko)(Palo ea bana ba ngolisitsoeng) (Inani lezingane ezibhalisiwe)	Total ..... Boys ..... Girls .....
1.4.4 What is the total number of under-fives who have been enrolled at your ECD by age? (bangaphi abatwana aba neminyaka engaphantsi kwesihlanu)(Thsivhalo tsha vhana vho nwalisako kha iyo crèche)(Ke palo efe ea batho ba tlase ho tlase ba ngolisitsoeng ho ECD ea hau ka lilemo) (Iyini inombolo ephelele yezingane ezibhalisiwe ezingaphansi kweminyaka emihlanu)	Years: 0-6 / 7mth<2 / 2–3 / 3–4 / 4–5 / Total No. of Children:
1.5.0 Are there children with special needs?	1 = Yes 2 = No If Yes, how many (Ukuba ewe, bangaphi)(Anali vha

(Abatwana aba Khubazekileyo Ingaba bakhona)(huna vhana vhaholefhali naa)(Na u na le bana ba nang le bokooa) (Zikhona yini izingane ezikhubazekile) 1.5.1 Type of disability (Uhlobo Lokukhubazeka) (Thsaka ya vhuholefhali) (Mofuta oa bokooa) (Uhlobo lokukhubazeka)	hore, ndivangana) (uma kunjalo, bangaki) ..... 1 = Blindness ☐ 2 = Physical ☐ 3 = Learning ☐ 4 = Medical ☐ 5 = Speech and Language ☐ 6 = Brain injury ☐ 7 = Others.....
1.5.2 Are there children in your communities who are supposed to be in ECD centre and are not? (ingaba kakakhona abatwana apha ekuhlaleni ebekufanele ukuba bayaya abatwaba koolwa abayi kumaziko)(Huna vhana muvhunduni/ shangoni vho teaho u vha crèche fhedzi avavho) (Na ho na le bana motseng oa heno ba lokelang ho ba setsi sa ECD 'me ha ba joalo)	1. Yes 2. No
1.5.3 What could be the reason for not sending children to ECD centre? (Ingaba ingasesiphi isizathhu sakuba bangayi kumumaziko)(Ndingani vhana avho vha sadi crèche)(E ka ba lebaka lefe la ho se romele bana setsing sa ECD) (Kungaba yini isizathu sokungathumeli izingane esikhungweni se-ECD)	1. Parents cannot afford 2. Parents think it is not important 3. Facility too far for children 4. Home schooling 5. Child is sick 6. Child is disabled 7. Child is malnourished 8. Others .....
1.6 Does the ECD centre have a committee? (Ingaba eliziko linayo ikomiti) (Na setsi sa ECD se na le komiti) (Isikhungo se-ECD sinekomiti)	1. Yes 2. No
1.6.1 Are parents involved in making decision with regards to food purchases or nutrition at the ECD centre? (Ingaba abazali bayayithatha inxaxheko ekuthengeni ekutya okanye ukondla kweziliko)(Na batsoali ba ameha ho etsa qeto mabapi le ho reka lijo kapa phepo e nepahetseng setsing sa ECD) (Ingabe abazali abathintekayo ekwenzeni isinqumo mayelana nokuthenga ukudla noma ukudla okunomsoco esikhungweni se-ECD)	1. Yes 2. No
1.6. 2 How much does the ECD charge as school fees? (Ingaba iziz zezikolo singakonani zabatwana)(ECD e lefella bokae chelete ea sekolo?) (	0-6 yr ..... 1-2 yr..... 3-4 yr..... 4-5yr.....
1.6.3 How many hours do the children spent at the ECD centre during the week days? (zingaphi ngeveki)(Bana ba qeta lihora tse	No of hour/day ..... Total per week .....

kae setsing sa ECD matsatsing a beke) (Bangaki amahora abantwana abawachitha esikhungweni se-ECD phakathi nesonto lezinsuku)	

2.0 ECD FOOD SECURITY SITUATION	
2.1.3 Does the ECD centre receive government subsidy? (Ingaba eliziko liyayitumana inxaso yemali kurhulumente)(Na setsi sa ECD se fumana thuso ea 'muso) (Ingabe isikhungo se-ECD sithola uxhasomali lukahulumeni)	1. Yes 2. No
2.1.4 If yes, from whom does the ECD centre receive the grants? (select many)(ukuba ewe, bayifumana kubani lenxaso)(Haeba ho joalo, setsi sa ECD se fumana mangolo ho mang) (Uma kunjalo, isikhungo se-ECD sitholaphi iziboneleło)	1. DoSD Grants 2. DoH nutrition subsidy 3. Municipality grant Others (specify)_____
2.1.5 Who provides food handouts/ donations for the ECD centre? (select many)(Ingaba ngubani omnye onikelayo kweliziko) (Ke mang ea fanang ka liphallelo tsa lijo / menehelo bakeng sa setsi sa ECD)	1=DoSD 2=DoH 3= NGO 4=Churches 5=Business people 6=Neighbours 7=Others ..... 8=N/A
2.1.6 Other forms of support from the organizations? (Ikhona naenye inxaso ofunyanwa leliziko)(Mefuta e meng ea tšehetso e tsoang mekhatlo) (Ezinye izinhlobo zokusekela ezivela ezinhlanganweni)	List ....
2.2.0 Is nutrition activities/lessons/topics included in the curriculum/ ECD programme for 36-59 months children (Na mesebetsi ea phepo e nepahetseng / lithuto / lihlooho li kenyelelitsoe lenaneong la thuto / ECD bakeng sa likhoeli tse 36 le 59 bana) (Imisebenzi yokudla / izifundo / izihloko ezifakiwe ohlelweni lwekharikhulamu / ECD ezinyangeni ezingama-36-59 ezinganeni) (Ngaba imisebenzi yesondlo /	1. Yes 2 No

izifundo / izihloko ezibandakanyiweyo kwikharityhulam / i-ECD kwinyanga ezingama-36-59 zezingane)	
2.2.1 Nutrition education material (Iziboneleloo zemfundo yokutya) (Lithuto tsa thuto ea phepo e nepahetseng) (Imfundo yokudla okunomsoco) (tick all that apply)	1. Posters 2. Pamphlets 3. Books 4. Nutrition Corner 5. Puzzles 6. Other .....
2.2.2 Does the ECD centre prepare food for the children? (Ingaba eliziko liyabaphekela nabatwana)(Na setsi sa ECD se lokisetsa lijo bakeng sa bana) (Ingabe isikhungo se-ECD silungisela ukudla kwezingane)	1 = Yes 2 = No
2.2.3 How many meals did the children have yesterday? (Zingaphi izidlo eziphiwe abatwana kweliziko izolo)(Lijo tse kae tseo bana ba neng ba e-na le tsona maobane) (Zingaki ukudla okwenziwa izingane zizolo)	…….
2.2.4 How many meals did the children usually have per day? (Zingaphapi izidlo eziphiwa babanowana ngosuku)(Lijo tse kae tseo hangata bana ba neng ba e-na le tsona ka letsatsi) (Zingaki ukudla okwakudingeka abantwana babe nakho ngosuku)	.....
2.2.5 If you buy food for the children, what is the main source of income to purchase food? (ukuba niyabathengele ukutya abanowana imaii niyifumona phi) (Haeba u reka bana lijo, mohloli o ka sehloohong ke ofe) (Uma uthengela ukudla izingane, yimuphi umthombo oyinhloko wemali engenayo ukuthenga ukudla)	1 = Grants 2 = School Levy 3 = Donors 4 = Others (Specify) .....
2.2.6 Does the ECD centre have a Menu planner? (Ingaba eliziko linaso isicwangciso semenyu) (Na setsi sa ECD se na le moralo oa menyetla) (Ingabe i-ECD isikhungo sinomhleli wemenyu)	1. Yes 2. No
2.2. 8 Is the menu planner displayed? (ingaba sexhonyiwe na esisicwangciso) (Na moralo oa menu o bontšoa) (Ingabe i-planner yemenyu ibonisiwe)	1. Yes 2. No 3 N/A
2.2.9 Who designed the Menu planner? (Ngubani ewabbala esisicwangciso) (Ke mang ea entseng moralo oa menu) (	1. Principal 2. Mama 3. Parents 4. ECD Committee 5. Dietitian 6. Consultant 7. Other .....

Ubani owadala umhleli wamenyu)	
2.2.9.1 What is the Menu based on when planning? (Yintoni imenyu eselelwe kuyo)(Lenaneo le thehiloeng hokae ha le rera) (Iyini imenyu esekelwe lapho uhlela)	1. Food pyramid 2. Macronutrients 3. Micronutrients 4. Available foods 5. Others .....
What constitutes a balanced diet (Yintoni eyenza ukutya okunokulinganisela) (Se bolelang lijo tse leka-lekaneng) (Yini eyenza ukudla okulinganiselayo)	1. Carbohydrates 2. Proteins 3. Vitamins & minerals 4. Fats and Oils 5. Water 6. Don't know
2.2.10 Who approves the menu planner? (Nguban i Owumela esisicwangciso)(Ke mang ea amohelang moralo oa menu) (Ubani owumela umhleli wamenyu)	1. Principal 2. Mama 3. Parents 4. ECD Committee 5. Dietitian 6. Consultant 7. Other .....
2.2.11 Do you always follow the Menu planner? (Ingaba nisoloko nsislanelela isiwangciso)(Na kamehla u latela moralo oa menu) (Ingabe ulandela njalo umhleli wamenyu) If not what are the constraints encountered? (Ukuba hayi, bobuphi ubunzima eniye nadibana nabo) (Haeba ha ho na mathata ao u kopaneng le 'ona) (Uma kungenjalo yiziphi izinkinga ezihlangabezane nazo)	1. Yes 2. No ....
2.2.7.2 How many times did it happen in past 3 month? (kwenze kangaphi kwenyonga zintathu eziqiVhileyo)(Ke makhetlo a mangata a ileng a etsahala ka likhoeli tse 3 tse fetileng) (Zenzeka kangaki ezinyangeni ezintathu ezedlule)	
2.3.0 Do you have supplementary feeding programme (Ngaba unenkqubo yokondla eyongezelelweyo) (Na u na le lenaneo le tlatsitseng la phepo) (Unayo uhlelo lokudla okungeziwe)	1. Yes 2. No
2.3.1 What is being given for the supplementary feeding programme (Yintoni enikelwayo kwinkqubo yokondla eyongezelelweyo) (Ho fanoa ka eng bakeng sa lenane la phepo le tlatsetso) (Yini enikelwayo ohlelweni lokudla lokungezelela)	1. Enriched porridge 2. Rice and mixed vegetables 3. Beans 4. Rice 5. Corn flakes and milk 6. Others .....
2.3.1.1 Are you aware of the nutritional composition of the supplementary food? (Ngaba uyayibona indlela yokondla kokutya okuncedisayo) (Na u tseba mokhoa oa phepo ea phepo ea lijo tse tlatsetsang) (Uyakwazi ukwakheka kokudla	1. Yes 2. No

okunomsoco wokudla okungeziwe)	
2.3.2 Where do the children go for the feeding?(Baya kuphi na abantwana ekudleni) (Bana ba ea hokae ho fepa)	1. At the ECD centre 2. Nearby School 3. Community Hall 4. Community member's house 5. Other .....
2.3.3 How often do the children receive supplementary food? (Ngaphi na abantwana bafumana ukutya okungezelelweyo) (Bana ba fumana khafetsa lijo tse kae) (Bangaki abantwana abathola ukudla okungeziwe)	1. Daily 2. Weekly 3. Monthly 4. Other .....
2.3.4 What is your opinion on the supplementary feeding programme? (Yintoni oyijonga ngayo kwinkqubo yokondla eyongezelelweyo)(U nahana'ng ka lenaneo la phepo le tlatsetso) (Uyini umbono wakho ohlelweni lokudla okungeziwe)	1. Good 2. Bad 3. Neutral
2.3.5 Explain your statement above (Cacisa uluvo lwakho)?(Hlalosa polelo ea hau ka holimo) (Hlalosa polelo ea hau ka holimo) (Chaza isitatimende sakho ngenhla)	.....
2.4.0 Does the ECD centre have a nutrition garden? (Ingaba iziko linayo igodi yondlo) (Na setsi sa ECD se na le serapa sa phepo e nepahetseng) (Chaza isitatimende sakho ngenhla)	1. Yes 2. No
2.4.1 Source of water for gardening? (Asuka phi amanzi okuncancashela igadi) (Umthombo wamanzi wokulima)	1. Tap 2. Borehole 3. Unprotected well 4. Protected well 5. Other_____
2.4.2 Is the water source available throughout the year (Ingaba oyafumaneka unyaka wonke) (Na mohloli oa metsi o fumaneha ho pholletsa le selemo) (Ingabe umthombo wamanzi utholakala unyaka wonke)	1. Yes 2. No
2.4.3 If not perennial what alternative is available? (Ukuba hayi, yeyiphini enye indlela eniwafumana ngayo)(Haeba e sa fumanehe ho pholletsa le selemo mohloli o mong oa metsi ke ofe) (Uma kungenjalo kungakapheli yimuphi okunye okutholakalayo?)	1. Tap 2. Borehole 3. Unprotected well 4. Protected well 5. Other_____
2.4.4 Types of crops grown in the garden? (udidi lwezityalo ezityalwe kulegadi)(Mefuta ea lijalo tse lenngoeng serapeng) (Izinhlobo zezitshalo ezitshalwe engadini)	1. Beetroot 2. Cabbages 3. Carrots 4. Buttemuts 5. Spinach 6. Kale 7. Potatoes 8. Rape 9. Onions 10. Herbs 11. Pepper 12. Others……
2.4.5 What's the use of produce from the garden? (Ho sebelisoa lihlahisoa tse tsoang serapeng)(Iyini	

ukusetshenziswa kwemikhiqizo evela engadini)	
2.4.6 How many times do you feed from the garden? (Ingaba kutyiswa kangaphi kule gadi ingaba sityiswa kangaphi isivuno sale gadi)(Ke makhetlo a mangata hakae a likhohlopo tse tsoang serapeng) (Udla izikhathi ezingakanani kusukela engadini)	1. Daily 2. 3 times per week 3. Once/week 4. Fortnightly 5. Monthly
2.4. / How do you store/use surplus food from the garden? (ingaba isivuno esishiyekileyo sigcinwa okanye sisetyenziswa kanjani)(U boloka lijo tse ngata joang serapeng) (Ungagcina kanjani / usebenzise ukudla okungaphezu kwensimu)	
2.4.8 Do you have the nutrition garden throughout the year? (Ingaba neninayo legadi sesondlo unyaka wonke)(O na le serapa sa meroho ho pholletsa le selemo) (Unayo ingadi yokudla okunomsoco unyaka wonke)	
2.4.9 What problems do face in establishing nutrition gardens at the ECD centre? (Ingaba zeziphi ingwaki enithe nadibhana nzo xa kuselwana legadi yesondlo kweziliko)(Ke mathata afe ao u tobanang le 'ona ho theha lirapa setsing sa ECD) (Iziphi izinkinga ezibhekene nazo ekusunguleni izingadi zokudla okunomsoco esikhungweni se-ECD)	
2.4.10 What do you need to enhance nutrition gardens?(Ingaba yintoni edingekhayo ukuze kuphuculwe iigadi sensondlo kwamaziko abatwana)(Ke mathata afe ao u tobanang le 'ona ho theha lirapa setsing sa ECD) (Yini oyidinga ukuthuthukisa izingadi zokudla)	

INFANT FEEDING

3.0 Is there anyone who takes care of the children to ensure that they are feeding well during meal times at the ECD centre? (Ngaba kukho nabani na onyamekela abantwana ukuqinisekisa ukuba bayondla kakuhle ngexesha lokutya kwiziko le-ECD) (Na ho na le motho ea hlokomelang bana ho etsa bonnete ba hore ba fepa hantle nakong ea linako tsa lijo setsing sa ECD)(Ngabe ukhona onakekela izingane ukuze ziqiniseke ukuthi zidla kahle	1. Yes 2. No If Yes, Specify .....

ngesikhathi sokudla esikhungweni se-ECD)	
Who is responsible? (Ngubani onoxanduva)(Ke mang ea ikarabellang) (Ubani onomthwalo wemfanelo)	1. Principal. 2. Teacher 3. Facilitator 4. Cooks 5. Others
3.1.0 Age of the youngest baby? (Uneminyaka engakanani ayena mntwana umncinci apha kweliziko)(Nako ea lesea le monyenyane ka ho fetisisa) (Umdala wengane encane)	.....
3.1.1 Do you prepare different meals for each age group? (Ngaba ulungiselela ukutya ezahlukeneyo kwiqela ngalinye leminyaka) (Na u lokisetsa lijo tse fapaneng bakeng sa sehlopha se seng le se seng) (Ingabe ulungiselela ukudla okuhlukile kweqembu ngalinye lobudala)	1. Yes 2. No
3.1.2 At which month were solid foods given for the first time to the infants <6 months at the ECD centre(Ngaliphi inyanga kwakukho ukutya okuqinileyo okunikwe umntwana kwiziko le-ECD)(Khoeli efe e ne e le lijo tse matla tse fuoeng lesea setsing sa ECD) (Ingabe ulungisa ukudla okuhlukeneyo eqenjini ngalinye leminyaka)	
3.1.3 Have you ever heard about exclusive breastfeeding? (Ngaba uke weva malunga nokuncelisa) (Na u kile ua utloa ka ho anyesa lebese le khethehileng) (Uke wezwa mayelana nokudla umntwana nobisi lomama kuphela)	
3.1.4 What are the benefits of exclusive BF? (Iziphi iingenelo zokuncelisa kuphela) (Melemo ea hau ke efe) (Yiziphi izinzuzo)	
3.1.5 What did you feed yesterday children less than 6 months at this ECD centre?(Yintoni oyondle ngayo izolo abantwana abangaphantsi kweenyanga ezintandathu kwiziko lee-ECD)(Ingaba ndibatyise ntoni abantwana abanenyanga ezisithandu ngeminyaka)(U fepa eng maobane bana ba ka tlase ho likhoeli tse tšeletseng setsing sena sa ECD) (Yini oyondle izingane zangezinyanga eziyisithupha ngaphansi kwalesi sikhungo se-ECD)	....
3.1.6 What else do you give to babies under 6 months? (Yiyiphi enye into eniyinika abantwana abangaphantsi kweenyanga ezi-6)(Ke eng hape eo ue fang masea a ka tlase ho likhoeli tse 6) (Yini enye eniyinika izingane ezingaphansi kwezinyanga ezingu-6)	
3.1.7 What are the disadvantages of mixed feeding to children under 6 months?(Ziziphi iingxaki zokutya okuxubekileyo kubantwana abangaphantsi kweenyanga ezi-6) (Tintoni enye eniyisa abantwana abaneenyanga ezingaphanntsi kweenya ezisithandathu)(Ho na le mathata afe a ho fepa bana	

ka tlase ho likhoeli tse tšeletseng) (Yiziphi izinkinga zokudla okuxutshwe ezinganeni ezingaphansi kwezinyanga ezingu-6)	
3.1.8 What did you feed yesterday children 7 months – 1 year? (Yintoni oyondle ngayo izolo iintsuku ezi-7-1 unyaka) (U fepa eng maobane bana likhoeli tse 7 - selemo se le seng) (Yini oyondla izingane zezolo izinyanga ezingu-7 - unyaka owodwa)	1. Plain Porridge 2. Porridge with peanut butter 3. Porridge with margarine 4. Purity 5. Rice with meat 6. Pap with soup 7. Potatoes 8. Bread 9. Soup 10. Others .....
3.1.8.1 What did you feed yesterday children 2 - 5 years? (Yintoni oyondle ngayo izolo iintsuku ezi-2 ukuya kuma-5) (U fepa eng maobane bana ba 2 - 5 lilemo) (Yini oyondla izingane zango-2 kuya ku-5 izolo)	1. Plain Porridge 2. Porridge with peanut butter 3. Porridge with margarine 4. Purity 5. Rice with meat 6. Pap with soup 7. Potatoes 8. Bread 9. Soup 10. Others .....
3.1.9 Do you at times have children refusing to eat? (Ingabe niyabanika abtwana iziqhamo ngamanye amaxesha)(Ingabe bakhona abantwana abangatyiyo)(Na ka linako tse ling u na le bana ba hanelang ho ja) (Ingabe ngezinye izikhathi izingane zenqaba ukudla)	1. Yes 2 No
3.1.9.1 How do you encourage the young children to eat? (Nibakhuza kanjani abatwana abancinci ukuze batye) (U khothaletsa bana ba banyenyane joang hore ba je) (Ukhuthaza kanjani izingane ezincane ukuba zidle)	1. Giving them attention during meals, talk to them, make meal times happy times clap hands 2. make funny faces/play/laugh 3. demonstrate opening your own mouth very wide/modelling how to eat 4. say encouraging words 5. draw the child's attention 6. Other 7. Don't know
3.1.10 Do you give the children fresh fruits at times (Ingabe niyabanike abantwana iziqhamo ngamanye amaxesha)(Na u fa bana litholoana tse ncha ka linako tse ling) (Ingabe unikeza izingane izithelo ezintsha ngezinye izikhathi)	1. Yes 2 No
3.1.10.2 If Yes, circle all that apply (ukuba ewe, ketha iziqhamo ezixelweyo) (Haeba E, potoloha tsohle tse sebetsang) (Uma Yebo, ujikeleze konke okusebenzayo)	1. Apples 2. Banana 3. Guava 4. Kiwi. 5. Oranges 6.Peaches 7. Avocado 6. Pears 7. Banana 8. Granadilla 9.Others……..
3.1.12 Does the ECD centre have storage facilities/ refrigerator? (Ingabe iziko linayo indawo yokungina okanye ilefridge)(Na setsi sa ECD se na le mehala ea polokelo / sehatsetsing) (Ingabe isikhungo se-ECD sinendawo yokugcina / ifriji)	1. Yes 2. No
3.1.12.1 What do you do with left overs?(Nenzantonyi ngokutya okushiyekileyo)(U etsa'ng ka li setseng) (Wenzenjani ngemali esele)	

3.1.13 Do you think it's important to safely store food? (Ingaba ucinga ukula kubalekile ukugcina ukutya ngendlela ekhuselekileyo)(Na u nahana hore ke habohlokoa ho boloka lijo ka mokhoa o sireletsehileng) (Ucabanga ukuthi kubalulekile ukugcina ukudla ngokuphephile)	1. Yes 2. No
3.1.13 Why is it important to safely store food? (Kuthenι kubalikile ukugcina ukutya ngedlela ekhuselekelileyo)(Kungani kubalulekile ukugcina ukudla ngokuphepha)	
3.1.14 Are vegetables important to eat? (Ingaba ibaluleke kangakanani into yokutya imfino) (Na meroho e bohlokoa ho e ja) (Ingabe imifino ebalulekile ukudla)	1. Yes 2. No
3.1.15 Why are vegetables important to eat? (Ingaba kabaluleke kangakanani ointo yokutya imfino)(Ke hobane'ng ha meroho e le ea bohlokoa ho e ja) (Kungani imifino ibalulekile ukuyidla)	
3.1.16 Source of fuel for preparing children's food? (Niwatumana phi amatutha wokubasa xa nephikela abatwana)(Mohloli oa mafura bakeng sa ho lokisetsa lijo tsa bana) (Umthombo wamafutha okulungiselela ukudla kwezingane)	1. Electricity 2. Gas 3. Paraffin 4. Charcoal 5. Gel 6. Wood 7. Others
3.1.17 Where do you purchase the fuel from? (ingaba niwathenga phi matutha) (O reka hokae mafura) (Uthenga kuphi uphethiloli kusuka)	
3.1.18 Average monthly expenditure on fuel? (Ingakanani imali eniyisebenzisa ngenyanga ukuthenga lomafutha wokubsa)(Karolelano ea litšenyehelo tsa khoeli le khoeli) (Isilinganiso sezindleko zenyanga ngenyanga)	ZAR.....
3.1.19 What constraints do you face in getting the fuel? (ingaba zeziphi iinqxaki enidibana nazo ekufumaneni lamafutha wokubasa) (Ke mathata afe ao u thulanang le 'ona ho fumana oli) (Iziphi izinkinga obhekana nazo ekutholeni uphethiloli)	
3.1.20 What is the staple food you give to children? (Kokuphi "ukutya tya"enikunika abantwana) (Ke lijo life tse tloaelehileng tseo u li fang bana) (Iyini ukudla okuyisisekelo okupha izingane)	1. Potatoes 2. Pap 3. Porridge 4. Cereals 5. Rice
3.1.21 How do you normally serve the food? (Uhlala ukhonza njani ukutya) (U tloaetse ho sebeletsa lijo joang) (Uvame ukukhonza kanjani ukudla)	
3.1.22 How do you usually prepare the staple food? (Nikupeheka kanjani "ukukutya tya) (Hangata u itokisetsa lijo tse tloaelehileng joang) (Uvame kanjani ukulungisela ukudla okuyisisekelo?)	
3.1.23 How do you usually prepare your leafy vegetables? (Niyipheka kanjani	Boil in water and oil for 10—20 minutes

imifino enamagcabi) (Uvame ukulungiselela kanjani imifino yakho yamahlamvu)	Boil in water and oil for 5 - 10 minutes Fry in oil for less than 5 minutes Boil in water only for 10—20 minutes Other specify
3.1.24 How do you usually prepare your meat? e.g chicken, mutton excluding fish (Niyipheka kanjani inyama) (U atisa ho lokisetsa nama ea hao joang) (Uvame ukulungiselela kanjani inyama yakho)	Cook at low heat for 40-60 minutes Fry in oil for less than 10 minutes Cook in oil and water for 10 minutes Boil in water for 10—20 minutes Other specify
3.1.25 Who makes the decision on what type of food to cook at the ECD? (Ngubani owenza singqibo sokuba kuphekwa okuphi ukutya kwez=liziko) (Ke mang ea etsang qeto mabapi le lijo tsa mofuta ofe oa ho pheha ECD) (Ubani owenza isinqumo ukuthi yiluphi uhlobo lokudla okuzopheka e-ECD)	
MALNUTRITION	
3.2 Have you ever heard about malnutrition? (Ngaba wakha wakuva ngokungondleki) (Na u kile ua utloa ka khaello ea phepo e nepahetseng) (Wake wazizwa ngokungondleki)	1. Yes 2. No
3.2.1 If Yes, where did you get the information about malnutrition from? (Ukuba ewe. Nanizifumene phi iincukacha zokungondleki) (Uma kunjalo, utholaphi ulwazi mayelana nokungondleki kusuka)	1. Doctor 2. Nurse 3. Learn from training 4. Poster/pamphlets 5. TV/Radio 6. Parents 7. Peers 8. Others .....
3.2. 3 Is there a local term for malnutrition? (ngolwimi lwasekuhlaleni unokubiza njani ukungondleki) (U bitsa khaello ea phepo e nepahetseng ka puo ea hau) (Yini obiza ukungondleki ngolimi lwakho)	
3.2.4 Do you think malnutrition is a problem in your community? (Ngaba ucinga ukuba ukungondleki kuyinkathazo kwingingqi yakho) (Ucabanga ukuthi ukungondleki kuyinkinga emphakathini wakho) (Na u nahana hore khaello ea phepo e nepahetseng ke bothata motseng oa heno)	
3.2.5 Which group of people is mostly affected? (Liliphi iqela labantu elichaphazelekayo) (Ingabe leliphi elona qela lichaphaze leka kakhulu)(Yiliphi iqembu labantu elithinteka kakhulu)	
3.2.6 What are the causes of malnutrition? (Iziphi izizathu zokungondleki) (Ziyini izimbangela zokungondleki) (Lisosa tsa khaello ea phepo e nepahetseng ke life)	1. Inadequate food intake 2. Eating unbalanced diet 3. Eat stale foods 4. Congenital defects of interior organs 5. Infections e.g. bacterial, viral, parasitic, fungal 5. Others
3.2.7 How can you tell that a child is malnourished (Unokuxelela njani ukuba umntwana akanakondliwa) (U ka tseba joang hore ngoana o na le phepo e	

nepahetseng) (Ungatshela kanjani ukuthi ingane ingondlekile) 1. Silky hair 2. Distended abdomen 3. Weak/powerless 4. Moon face 5. Severe wasted 6. Vomiting 7. Diarrhoea 8. Others……	
3.2.8 Do you have children under the age of 5 who have problems of swelling both feet or the body and face? (Ngaba unabantwana abangaphantsi kweminyaka engama-5 abanengxaki yokuvuvukala iinyawo okanye umzimba kunye nobuso)(Na u na le bana ba ka tlaase ho lilemo tse hlano ba nang le mathata a ho ruruha maotong kapa mmele le sefahlehong?) (Ingabe unabantwana abangaphansi kweminyaka engu-5 abanenkinga yokuvuvukala kokubili izinyawo nomaumzimba nobuso)	1. Yes 2. No If Yes how many? (Ukuba ewe, bangaphi inani) .....
3.2.8 Did you have children with the following signs, (Ngaba unabantwana ngeempawu ezilandelayo)(U na le bana ba nang le matšoao a latelang) (Ninabo na abantwana aba nezimpawu) (. if YES give number? (Ukuba ewe, bangaphi inani) 1. Severe wasting Marasmus…… 2. Wrinkled Skin…… 3. Cloudy or sore eyes …… 4. Repeated strange movement…….. 5. Growth retardation…….. 6. Mental changes such as confusion and irritability…… 7. Slow wound healing…… 8. Chronic diarrhoea……. 9. Dull yellow complexion……. 10. Large upper abdomen and sunken lower abdomen……10. Miserable ……	
3.2.9 What causes swelling of both feet (oedema)? (Yintoni ebangela ukuvuvukala kwezinyawo zombini) (Se etsa hore ho ruruha ha maoto ka bobeli) (Yini ebangela ukuvuvukala kwezinyawo zombili)	
3.2.10 What causes severe body wasting? (Yintoni ebangela ukuba umzimba uchithe kakhulu) (Ke'ng e etsang hore 'mele o senyehe haholo) (Yini eyenza umzimba ube mbi kakhulu)	
3.2.11 Are there malnourished children at your ECD centre? (Ngaba kukho abantwana abangondlekiyo kwiziko lakho le-ECD)(Na ho na le bana ba nang le phepo e nepahetseng setsing sa hau sa ECD) (Zikhona yini izingane ezingenalutho esikhungweni sakho se-ECD)	
3.2.12 What do you think about parents whose children are malnourished? (Ucinga ntoni ngabazali abanabantwana abangenasondlo) (Nicinga ntoni ngabazali abanabantwana abangondlekanga) (U nahana'ng ka batsoali bao bana ba bona ba nang le phepo e nepahetseng)	
3.2.13 Is there anything you can do at the ECD centre to prevent malnutrition? (Na u ka etsa letho ho setsi sa ECD ho thibela khaello ea phepo e nepahetseng) (Ungakwenza nomma yini esikhungweni se-ECD ukuvimbela ukungondleki) (Ngaba kukho na into ongayenza kwiziko le-ECD ukukhusela ukungondleki)	
3.2.14 What is being done to prevent malnutrition? (Se ntseng se etsoa ho thibela khaello ea phepo e nepahetseng) (Yintoni eyenziwa ukukhusela ukungondleki)(Yini eyenziwa ukuvimbela ukungondleki)	
3.2.15 How is malnutrition treated in your community? (Ho haelloa ke phepo e nepahetseng ho tšoarca joang sebakeng sa heno) (Ukunqongophala kungaphathwa njani kuluntu lwakho)(Ukuntuleka kokudla okunomsoco kuphathwa kanjani emphakathini wakho)	

3.2.16 Are you caring for the sick children at the ECD centre?' (Ngaba uyabakhathalela abantwana abagulayo kwiziko le-ECD) (Na u hlokomela bana ba kulang setsing sa ECD) (Ingabe unakekela izingane ezigulayo esikhungweni se-ECD)	
3.2.17 Who provides the cares for the sick children?' (Ngubani obonelela abantwana abagulayo) (Ke mang ea fanang ka tlhokomelo ho bana ba kulang) (Ubanikeza izinakekela izingane ezigulayo)	
3.2.18 What problems are encountered in caring for the sick children at the ECD centre?' (Ziziphi iingxaki ezijongene nazo ekunyamekeleni abantwana abagulayo kwiziko le-ECD) (Ke mathata afe ao u thulanang le 'ona ho hlokomela bana ba kulang setsing sa ECD) (Iziphi izinkinga ezitholakala ekunakekeleni izingane ezigulayo esikhungweni se-ECD)	
IRON DEFICIENCY	
5. 0 Have you heard about iron-deficiency anaemia?' (Ngaba uvile nge-iron deficiency anemia) (Na u utloile ka khaello ea khaello ea khauta) (Uke wezwa mayelana nokuntula kwe-anemia yensimbi)	1. Yes 2. No
5.1 If YES, how can recognize that a child at the ECD centre has anaemia?' (Ukuba ewe, ingazi njani ukuba umntwana esikhungweni se-ECD unempilo) (Haeba E, o ka hlokomela joang hore ngoana setsing sa ECD o na le phokolo ea mali) (Uma i-YEB, ingaqaphela kanjani ukuthi ingane esikhungweni se-ECD ine-anemia)	1. Less energy/weakness 2. Paleness/pallor 3. Spoon nails/bent nails 4. More likely to become sick (less immunity to infections) 5. Other Don't know
5.2 What are the health risks for infants and young children of a lack of iron in the diet? (Ziziphi iingozi zempilo kwiintsana kunye nabantwana abancinci bokunqongophala kwesinyithi ekudleni) (Ke likotsi life tsa bophelo bakeng sa masea le bana ba banyenyane ba ho hloka tšepe ha ba ja) (Yiziphi izingozi zezempilo ezinganeni nasezingane ezincane zokuntuleka kwensimbi ekudleni)	1. Delay of mental and physical development 2. Other 3. Don't know
5.3 What causes anaemia in children?' (Yintoni ebangela i-anemia kubantwana) (Ke eng e bakang khaello ea mali ho bana) (Yini eyenza i-anemia ezinganeni)	1. Lack of iron in the diet/eat too little, not much 2. Sickness/infection (malaria, hookworm infection, other infection such as HIV/AIDS) 3. Heavy bleeding during injury 4. Other 5. Don't know
5.4 How can anaemia be prevented at the ECD centres?' (Unemia ingakhutshwa njani kumaziko e-ECD) (Likokoana-hloko li ka thibeloa joang litsing tsa ECD) (I-anemia ingavinjelwa kanjani ezikhungweni ze-ECD?)	1. Eat/feed iron-rich foods/having a diet rich in iron 2. Eat/give vitamin-C-rich foods during or right after meals 3. Take/give iron supplements if prescribed

	4. Treat other causes of anaemia (diseases and infections)—seek health-care assistance 5. Continue breastfeeding (for infants 6–23 months old) 6. Other 7. Don't know
5.6 Can you list examples of foods rich in iron?' (Ngaba unokuluhlula imizekelo yokutya esityebi) (Na u ka thathamisa mehlala ea lijo tse nang le tšepe) (Ungabeka uhlu lwezibonelo zokudla okunensimbi)	1. Organ meat 2. Flesh meat 3. Insects 4. Seafoods 5.Green Leafy vegetables 6. Others 7. Don't know
5.7 When taken during meals, certain foods help the body absorb and use iron. What are those foods? (Xa kuthathwa ngexesha lokutya, ukutya okuthile kukunceda umzimba uthathe kwaye usebenzise intsimbi. Ziziphi ezo zokutya) (Ha li noa a nakong ea lijo, lijo tse itseng li thusa 'mele hore o amohele 'me o sebelise tšepe. Lijo tseo ke life) (Uma kuthathwa ngesikhathi sokudla, ukudla okunye kusiza umzimba ukuthi ubambe futhi usebenzise insimbi. Yiziphi lezo zokudla)	1. Vitamin-C-rich foods, such as fresh citrus fruits (orange, lemons, etc.) 2. Other3. Don't know
5.8 Some beverages decrease iron absorption when taken with meals. Which ones? (Ezinye iziyobisi ziyancipha ukunciphisa i-iron xa kuthathwa ukutya. Eziphi) (Lithethefatsi tse ling li fokotsa ho nkoa ha tšepe ha li nkoa ka lijo. Ke life) (Ezinye iziphuzo ziyancipha ukungena kwensimbi lapho kuthathwa ukudla. Ziphi zona)	1. Coffee 2. Tea 3. Other 4. Don't know
DIARRHOEA MANAGEMENT	
6.0 Does the ECD centre have a First Aid kit (Nanike eva ngesifo sohudo) (Na setsi sa ECD se na le setsi sa thuso ea pele) (Ingabe isikhungo se-ECD sinesikebhe sokuqala sokusiza)	1. Yes 2. No
6.1 Have you ever heard about diarrhoea? (Ingaba ikit yokunceda kemnganzakalo)(Na u kile ua utloa ka letšollo)(Ingabe i-ECD yesikhungo sinesikebhe sokuqala yokusiza)	1. Yes 2. No
6.1.1 Where did you get the information from? (nalufumana phi ololwazi) (U fumane boitsebiso boo ho tsoa hokae) (Uthole kuphi ulwazi)	1. Doctor 2. Nurse 3. Learn from training 4. Poster/pamphlets 5. TV/Radio 6. Parents 7. Peers 8. Others .....
6.2 What are the signs and symptoms of diarrhoea? Zeziphi iimpawu zesifo sohudo)(Matšoao a letšollo ke afe) (Ziyini izimpawu nezimpawu zokuhuda)	1. Producing watery stools 2. Passing stools more than three times a day 3. Producing blood stained stool with or without mucus 4. Producing rice watery stools 5. Others .....
6.3 Have you ever been taught about diarrhoea? (Nanike	1. Yes 2. No

nafundiswa ngesifo sohudo)(Na u kile ua rutoa ka letšollo)(Wake wafundiswa mayelana nesifo sohudo)	
6.4 Looking at children at ECD centres what do think could be the major causes of diarrhoea? (tick all that apply) (Ungathi zeziphi imbangela zesifo)(Ukubheka izingane ezikhungweni ze-ECD yini ocabanga ukuthi kungaba yizimbangela ezinkulu zokuhuda)	1. Not washing hands with soap/ detergent 2. Washing hands in the same bowl 3. Eating contaminated foods 4. Overstayed cooked food 5. Drinking contaminated water
6.5 Has any child suffered from diarrhoea at the ECD centre (Ingaba ukukhona umntwana owake wanaso esisifo apha "e-crèche")(Na ho na le ngoana ofe kapa ofe ea nang le letšollo setsing sa ECD) (Ingabe kukhona ingane ehlushwa yisifo sohudo esikhungweni se-ECD)	1. Yes 2. No If yes, how many .....
6.6 How did you treat the child? (tick all that apply)(Ingaba nemnyanga njani umntwana othe wanesisifo) (U ile ua mo tšoara joang) (Wamphatha kanjani ingane)	1. Given salt and sugar solution 2. Treated at the health centre 3. Given herbal remedies 4. Gave medicine from the first aid kit 5. Bought medicine from pharmacy 6. Treated by the traditional healer 7. Visited Pastor for spiritual help 8. No treatment was given 9 Parents took the child elsewhere 10. Others
6.7 How are you preventing incidences of diarrhoea at your ECD centre? (tick all that apply)(Ingaba nisi thentela njani isinganeko sesisifo apha "e-creche") (U thibela letšollo joang setsing sa hau sa ECD) (Uvimbela kanjani izimo zokuhuda esikhungweni sakho se-ECD)	1. Safe preparation of food 2. Ensure children wash their hands with soap /detergent before eating 3. Ensure children wash their hands with soap /detergent after using the toilet. 4. Dispose stools in toilet 5. Use water from protected source 6. Use of clean dish cloths 7. Others .....
6.8 Are you able to practice these preventive methods of diarrhoea management? (Ngaba unako ukuzisebenzisa ezi ndlela zokuthintela ukulawulwa kwehudo) (Na u khona ho sebelisa mekhoa ena e thibelang ea letšollo) (Ungakwazi yini ukwenza lezi zindlela zokuvimbela ukuhanjiswa kwesisu?)	1. Yes 2. No
6.9 If No, why are you not practicing these methods (Ukuba Hayi, kutheni ungayisebenzisi le ndlela) (Na u khona ho sebelisa mekhoa ena e thibelang ea letšollo) (Uma cha, kungani ungenzi lezi zindlela)	1. No dish cloths 2. Water shortages 3. There are no toilets 4. No time 5. Shortage of staff 6. Others
6.10 Do you think diarrhoea is a problem in ECD centres (Ngaba ucinga ukuba urhudo luyingxaki kumaziko e-ECD) (Na u nahana hore letšollo ke bothata litsing tsa ECD) (Ucabanga ukuthi isifo sohudo sinenkinga kwizikhungo ze-ECD)	1. Yes 2. No

6.11 Has there been a diarrhoea outbreak in ECD centres or community? (Ngaba kukho ukuphazamiseka kwesifo sohudo kwiziko lee-ECD okanye uluntu) (Na ho bile le tšollo ea letšollo libakeng tsa ECD kapa sechaba)(Kukhona yini ukuhanjiswa kwesifo sohudo esikhungweni se-ECD noma umphakathi)	1. Yes 2. No
6.12 Do you know any surrounding places in the community where children can get diarrhoea? (Ngaba uyayazi naziphi na indawo ezikufutshane kwindawo apho abantwana banokufumana isifo sohudo) (Na u tseba libaka tse haufi le moo sechaba se ka fumanang letšollo) (Uyazi yini izindawo ezizungezile emphakathini lapho izingane zingathola khona isifo sohudo)	1. Yes 2. No
6.13 What are the conditions that may facilitate the spread of diarrhoea? (Ziziphi iimeko ezingabangela ukusabalalisa ihudo) (Ke maemo afe a ka thusang ho jala letšollo) (Yiziphi izimo ezingase zenze ukusakazeka kwehudo)	1. Poor hygiene standards 2. Poor toilets 3. No potable water 4. Problems with sewerage system 5. No water in taps most of the times 6. Specify
WATER AND SANITATION	
7. 0 What's the source of water you use at the ECD centre? (Amanzi niwafuma njani) (Mohloli oa metsi ao u o sebelisang setsing sa ECD ke ofe) (Iyini imithombo yamanzi oyisebenzisayo esikhungweni se-ECD)	a) Piped water b) Community tap c) Borehole water d) Protected well e) Unprotected well f) Rainwater collected in a tank g) River/Dam
7.1 How far is this water source from the ECD centre?(ingaba lendawo ekufumaneka amanzi kangakanani) (Umkhawulo wamanzi ungakanani kusuka esikhungweni se-ECD)	a) Less than 10 mins b) 10 - 20 mins c) 20 - 30 mins d) 30 - 1 hour e) Source at ECD
7.2 Do you treat the water to make it safe? (Ingaba niyawacoca amanzi) (Na u noa metsi ho e sireletsa) (Ingabe uphatha amanzi ukuze awusondeze)	a) Boil b) Add bleach c) Use water filter d) Solar disinfect e) Aqua tablets f) Others
7.4 When do the children wash hands? (Ingaba abantwana bazihlamba nini izandla) (Ngabe izingane zigeza nini izandla)	1. Before and after eating 2. After touching animals 3. After coughing 4. Only when they are dirty 5. After visiting the toilet 6) Other.....

7.5 How do they wash the hands? (Ingaba bazihlamba njani izandla) (Ba hlatsoa matsoho joang) (Bageza kanjani izandla zabo)	a) In a basin b) under running water c) With soap in a basin d) With soap under running water e) Other (specify) .....
7.6 Where do you put waste? (Ilahlwa phi inkunkuma) (U senya litšila kae) (Ubekaphi udoti kuphi)	a) Rubbish pit b) Bin collected by local Authorities c) Undesignated open space d) Other (specify).....
7.7 Do you have the following? (Ikhona indawo yangasese) (O na le tse latelang) (Unayo okulandelayo) 7.7.1 Toilet 7.7.2 Hand washing basin	1 = Yes 2 = No 1 = Yes 2 = No
If yes, what is the nature of toilets (Ukuba ewe, yintoni uhlobo lwezindlu zangasese) (Haeba e, ho na le mofuta ofe oa matloana) (Uma u-yebo, uhlobo luni lwezindlu zangasese)	Ukuba ewe, iluhlobo olunjani
7.8 If toilet is available, select type? (Uhlobo lwendawo yengasese) (Haeba ntloana e le teng, khetha mofuta oa mofuta oa ntlo) (Uma indlu yangasese iyatholakala, khetha uhlobo)	1. Flush or pour/flush facilities connected to a sewer 2. Flush or pour/flush toilets without a sewer connection 3. Pit latrines with a slab 4. Pit latrines without slab/open pit 5. Composting toilets 6. Ventilated improved pit latrines 7. Bucket latrines 8 No facilities
7.9 How often do you clean the toilets? (Icocwa kangaphi yangasese indlu) (Ke hangata hakae u hlatsoang matloana) (Uvame ukuhlanza izindlu zangasese)	1. More than once a day 2. Once a day 3 twice per week 4. Others .....

ADDENDUM 2: ANTHROPOMETRIC ASSESSMENT FORM I FOR CHILDREN 6 – 59 months IN ECD CENTRES

PROVINCE	DISTRICT	ECD CENTRE NAME	RESPONDENT	DATE	REPORTED BY

ANTHROPOMETRIC ASSESSMENTS

No.	Name of Child	Surname	Sex	D.O.B (dd.mm.yy)	Weight (Kg)		Height (m)		Edema (Y/N)	MUAC (mm)		Months child has enrolled at ECD	Does the child has food allergies (Y/N)	Has the child been sick within the past 2 weeks? Y/N
					1	2	1	2		1	2			
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Observations .....

ADDENDUM 3 A: DIETARY DIVERSITY SCORE TOOL [2]

ECD staff will be requested to describe the foods that were served/ given children to eat on the previous day when they arrived at the ECD centre in the morning until they were dismissed later on the day. Starting with breakfast or any drink in the morning until last afternoon meal or snack.[2]

The research team will write all foods mentioned, writing and asking for individual ingredients were composite meals are mentioned. The interviewer should probe for meals and snacks not mentioned[2]

When the ECD staff complete the recall, the interviewer will put the mentioned foods in their respective food groups as indicated in ADDENDUM 3B.

Breakfast	Snack	Lunch	Snack

This questionnaire excludes foods eaten outside the ECD. Interviewer will probe ECD staff to check if children ate foods belonging to certain food groups not mentioned.

ADDENDUM 3 B: DIETARY DIVERSITY SCORE G9 TOOL [2]

FOOD GROUP	Food lists	Yes/ NO	Source of Food 1 Own production at ECD 2 Purchased, 3 Donated 4 Other			
***Group 1**: Grains, roots and tubers*	Porridge, bread, rice, noodles or other foods made from grains		1	2	3	4
	White potatoes, white yams, manioc, cassava or any other foods made from roots		1	2	3	4
***Group 2**: Vitamin A fruits and vegetables*	Pumpkin, Butternuts, carrots, squash or sweet potatoes that are yellow or orange inside, paw paw.		1	2	3	4
	Any dark green vegetables [spinach, Chinese rape]		1	2	3	4
	Ripe mangoes (fresh or dried [not green]), ripe papayas (fresh or dried), musk melon, water melon,		1	2	3	4
	Foods made with red palm oil, red palm nut or red palm nut pulp sauce, beetroot, red grapes, berries (strawberries & mulberry)		1	2	3	4
***Group 3**: Other fruits*	Any other fruits Peaches, lemon, white grapes, apples, grape fruit, bananas, kiwi, litchi		1	2	3	4
***Group 4**: Other vegetables*	Any other vegetables Broccoli, Okra, Kale, onions, tomatoes, cabbage, herbs, mushrooms		1	2	3	4
***Group 5**: Legumes & nuts*	Any foods made from beans, peas, lentils, nuts or seeds		1	2	3	4
***Group 6**: Meat, Poultry and Fish*	Liver, kidney, heart or other organ meats		1	2	3	4
	Any meat, such as beef, pork, lamb, goat, chicken or duck		1	2	3	4
	Fresh or dried fish, shellfish or seafood		1	2	3	4
	Grubs, snails or insects		1	2	3	4
***Group 7** Fats & Oil*	Any oil, fats, or butter or foods made with any of these		1	2	3	4
***Group 8:** Dairy products*	Infant formula, such as NAN, LACTOGEN		1	2	3	4
	Milk, such as tinned, powdered or fresh animal milk/ Amasi		1	2	3	4
	Yoghurt or drinking yoghurt		1	2	3	4
	Cheese or other dairy products		1	2	3	4
***Group 9**: Eggs*	Eggs		1	2	3	4

ADDENDUM 4: FOCUS GROUP DISCUSSION FOR ECD PRACTIONER/S

FOCUS GROUP DISCUSSION GUIDELINE

(Composition of the FDG 8 -12 people)

- Do you think malnutrition is a problem in your ECD centres or community and how do deal with such situation?
- What are the signs and symptoms of malnutrition in children?
- Has there been any children who are suffering from malnutrition in your community or the surrounding areas?
- Do you know any places within or in areas surrounding your community where people get treatment for malnutrition?
- What are the conditions that facilitate the incidences of malnutrition in communities and ECD centres?
- Do mothers and ECD practitioners in your community have access to nutrition information?
- What are the sources of such information?
- What nutrition-related services are available for children under 5 at your nearest clinic or health centre?
- Do nursing staff conduct immunization outreach programmes in ECD centres?
- Do most ECD centres have committees and are they involve in planning meals to be prepared or purchased at the ECD centre for the children?
- Are there any programmes that assist malnourished children in the community?
- Suggest improvements for the management of malnutrition in ECD centres?
- What are the major nutrition challenges in ECD centres and how can they be resolved?
- As parents are you worried about what your children eat throughout the day at the ECD centres, if it is a concern you what do you do to solve the challenge?
- Are parents actively involved/ engaged/ consulted in purchasing of food or determining the food children should eat in ECD centres?
- What are the challenges in engaging or involving parents in ECD affairs?
- What problems can children have if they don't eat before going to school and being hungry during the stay at ECD centres?

ADDENDUM 5: CONSENT FORM FOR ECD PRINCIPALS

PRINCIPAL INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

Assessing nutrition knowledge, attitude, behavior and practices (KABP) in early childhood development centres in Zandspruit and Orange Farm, Gauteng Province, SOUTH AFRICA

REFERENCE NUMBER:S15/12/280

PRINCIPAL INVESTIGATOR: JAMES MAJAHA

ADDRESS: Plot 123 Copperhouse, Nooitgedacht, HONEYDEW, 1747

CONTACT NUMBER: 0719110733

You have been chosen as part of this early childhood development (ECD) centre to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, you participation is entirely voluntary and you are free to decline to participate. If you say NO, this will not affect you and your ECD centre negatively in any way whatsoever. You are also free to withdraw from participating in the study at any point, even if you had initially agreed to take part.

This study has been approved by the Health Research Ethics Committee at Stellenbosch University and will be conducted within your rights, and we will do to the best of our ability not to take advantage of you in any way whatsoever but to ensure that you are protected and have freedom of expression during the data gathering process.

What is this research study all about?

Interviewing you (ECD practitioner) or any other staff member you appoint to represent this ECD centre in the nutrition survey.

Explanation to the ECD practitioners what the project aims to do and why you are doing it?

The research seeks to document practices you do with regard to nutritional wellbeing caring of under five children in the early childhood development centre in Orange Farm/Zandspruit.. Results will be shared with responsible people within the Department of Health and Social Services in Gauteng. This will in turn help ECD centres to have good nutrition programmes for children of all age groups. The research team will also take

note of good/ best caring practices already in place in some early childhood centres and this will be shared with struggling centres within the country,South Africa.

Explanation of procedures.

This research process or survey is in 2 parts. The first part involves an in-depth interview collecting relevant opinions from you on various issues of nutrition, food security, water and sanitation from a sample of questions already set aside. This may take up to 50 minutes as the researchers will be writing down your responses. Second part involves measuring the height and weight of all under five children at the ECD centre to determine hidden malnutrition levels within the ECD.

Explanation on selection process/ random choosing that may occur?

To ensure fair participation and selection of ECD centres in the areas mentioned, a random sampling methodology will be used. All ECD centres will be put together and random sample drawn out until the desired number of sampling units is achieved. Practitioners of the chosen ECD centre will be interviewed and all children's height, weight and MUAC noted. An in-depth questionnaire will be used to collect the relevant information and checked for completeness of the responses.

Why have you been selected to participate?

The survey seeks to get information pertaining knowledge, attitude, behaviour and attitude on nutrition in ECD centres and caring for the under-fives who spent greater part of their time during week days in these centres, hence, if, they don't receive good nutrition they will fail to grow well. Researchers want to gain insights on nutrition and caring in ECD centres since you are part of the services providers to this target group and your participation and contribution is highly appreciated to make a difference to future nutrition programmes.

What will be responsibilities?

You will sign this consent form agreeing to participate in the interview, directly answering a set of questions posed by the researcher. On the other hand you will give parents consent forms to complete for their under-five children to participate in the survey and collect the forms. You will also ensure that the register and date of births for the children to be assessed are made available to the researcher for him/her to be used later to analyse information collected on height and weight.

Will you benefit from taking part in this research?

There are no monetary benefits for participation in this survey. However, ECDs will receive appropriate nutrition trainings and support from various departments that will benefit the children enrolled and attending at various ECD centres. Practitioners will also gain access to nutrition resources

Are there in risks involved when taking part in this research?

A set of questions on a designed questionnaire will be used to collect the relevant opinions from you. There are no risks for your participation in this research. During the interview session the researcher may ask you to explain further, if ever you are comfortable or whenever relevant to obtain extra information of interest.

If you do not agree to take part, what alternatives do you have?

You are free to decline the participation as the ECD practitioner and you may assign another ECD staff to be interviewed.

Who will have access to your information/ questionnaire?

The research staff will also fully explain what the survey is all about to you to obtain your consent on the survey day. The information obtained in the survey will be specifically for gathering information to assist ECD centres and other service providers in improving nutrition issues in early childhood development centres and will be treated as private. Information will not be disclosed to any individual not involved in this research. At the end of the interview session data is submitted to electronically to the cloud for storage later accessed for analysis. The results from the survey will be communicated to you and other participants through your respective ECD centres and forums.

What will happen in the unlikely event of some form injury occurring as a direct result of your taking part in this research study?

For the measuring the height and weight of under fives, you will be requested to assist in safe guarding children ensuring they have lighter clothing for weight measure/ don't snatch and wear other children's clothes which may not go down well with other parents. The survey doesn't involve experimentation of harmful medicines / pharmaceutical products or drawing of tissue samples therefore children are safe therefore you can wholeheartedly participate.

Will you be paid to take part in this study and are there any costs involved?

Neither the principal nor your child will be paid to take part in the study but you will be having refreshments, fresh juice & muffins during the interview sessions.

Is there anything else that you should know or do?

- You can contact the study supervisor, Mrs HE Koornhof at tel. no 0219389597 if you have any further queries or encounter any problems.
- You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your Research Assistants and Coordinator
- You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I …….. grant the permission to take part in a research study entitled "Assessing nutrition knowledge, attitude, behavior and practices (KABP) in early childhood development centres in Zandspruit and Orange Farm, Gauteng Province, SOUTH AFRICA"

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is voluntary and I have not been pressurised in agreeing to participate.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may ask to leave the study before it has finished, if the study Coordinator or researcher feels it is in my best interests, or if the research does not follow the study plan, as agreed to.

Signed at (*place*) …….. on (*date*) …….. 2016.

…….. ……..

Signature of participant Signature of witness

Declaration by investigator

I *(name)* …….. declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*

Signed at (*place*) …….. on (*date*) …….. 2016.

…….. ……..

Signature of investigator Signature of witness

Declaration by interpreter

I *(name)* …….. declare that:

- I assisted the investigator (*name*) …… to explain the information in this document to (*name of participant*) …….. using the language medium of Afrikaans/English/Sesotho/Venda/Zulu/Ndebele/Sepedi/ Xhosa.

- We encouraged him/her to ask questions and took adequate time to answer them.
- I conveyed a factually correct version of what was related to me.
- I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) ..... on (*date*) ……..……..

....

Signature of interpreter Signature of witness

ADDENDUM 6: CONSENT FORM: PARENTS

PARENTS INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

Assessing nutrition knowledge, attitude, behavior and practices (KABP) in early childhood development centres in Zandspruit and Orange Farm, Gauteng Province, SOUTH AFRICA

REFERENCE NUMBER:S15/12/280

PRINCIPAL INVESTIGATOR: JAMES MAJAHA

ADDRESS: Plot 123 Copperhouse, Nooitgedacht, HONEYDEW, 1747

CONTACT NUMBER: 0719110733

Your child has been chosen to take part in a research project to be conducted at the ECD centre where your child is enrolled and attending. Please take some time to read the information presented here, which will explain the details of this research project. Please ask the study staff any questions about any part of this research project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how your child could be involved. Also, his/her participation is **entirely voluntary** and you are free to decline to participation. If you say NO, this will not affect your child and the ECD centre negatively in any way whatsoever. As a parent,you are also free to withdraw your child from participating in the study at any point, even if you had initially agreed to let him/her take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and this research will be done in a manner that ensures safety and protection of your child.

What is this research study all about?

Measuring your child's height, weight and mid upper arm circumference at the early childhood development (ECD) centres in Orange Farm and Zandspruit. The information will be analysed to see whether your child is growing well or failing compared to normal growth expected at his/her age. We will combine the information collected from measuring a number of children and see the proportion of those failing to grow well.

Explanation to parents what the project aims to do and why you are doing it?

The research seek to document practices done by principal with regard to caring and nutritional wellbeing of under five children in ECD centres and the measuring of children's weight and height. This information will be shared with the nongovernmental organizations and relevant government departments. They will closely look at the information and come up with programmes to help early childhood development centres to

provide good care and proper nutrition to children. Some ECD centres are feeding the children well, we will also write down the good practices and share with others to copy.

Explanation of procedures.

Survey involves measuring and noting down the height, weight and mid upper arm circumference of your child to see if he/she is growing normally. This will be conducted at the ECD centre by the research team. All children under the age of five at the selected ECD centres will have their height and weight noted.

Explanation on selection process / randomization process that may occur?

Not every child at the ECD centre has been selected to take part in this nutrition survey. Only children who fall in the age groups between 6 – 59 months (under five years) were selected randomly and information obtained from the results of height and weight measurements will be used to represent the nutrition situation of children at the ECD.

Why has your child been chosen to participate?

The survey seeks to get information pertaining knowledge, attitude, behaviour and attitude on nutrition in ECD centres. You child spend most of the time attending the ECDs, poor feeding practices and improper nutrition can badly affect his/ her growth. If not corrected earlier, the child will fail to catch up later in life and can be disadvantaged in many areas of life. Therefore, your child's participation will enable researchers to have insight on nutritional issues affecting the ECDs thereby propose solutions to gaps noted in assisting children in the ECD centres.

What will be your responsibilities as a parent?

As a parent for the child chosen to participate in the research at the selected ECD centres, you are required to sign this consent form, granting permission for your child to participate in the nutrition study/research or measuring exercise. Ensure that you avail to the principal of ECD centre and researchers, date of birth for the child, to enable feedback on the growth of the child deduced from weight and height measurements taken.

Will you benefit from taking part in this research?

There are no monetary/ personal benefits for your child's participation in this survey. Information gathered will however,assist parents and caregivers to receive appropriate nutrition trainings and support from various departments that will benefit the children enrolled and attending the ECDs and will also gain access to nutrition resources

Are there in risks involved in him/ her taking part in this research?

The University of Stellenbosch committee has properly considered and approved that this research ensuring it does not harm your child or put his/her life at risk. The research will therefore follow these guidelines to

ensure safety and protection while doing the best for your child and those he/ she represents.The researcher will use an electronic bathroom scale to record the weight and height meter for measuring height. Therefore there are no risks for your child to take part in this research. During the survey neither medicines/ pills will be administered to your son/daughter nor blood samples taken/drawn for analysis.

If you do not agree to take part, what alternatives do you have?

You are free to decline the participation of your child in this survey.

Who will have access to your child's information/ questionnaire?

The researcher will fully explain the scope of the survey to all participants to obtain their consent on the survey day. The information obtained in the survey will be specifically for assessing what needs to be done at ECD centres to improve nutrition of children enrolled. Information collected thus should be treated as private and will not be disclosed to any individual not involved in this research. At the end of the day survey papers are submitted to data capturers who will keep them in a locker for analysis. During the data entry process, questionnaires are coded; no names of the child will be entered into to the computer system for storage (data base). If the team identifies that your child is failing to growth and it's a serious situation, they will liaise with the principal to inform you to meet the team to explain the degree of the problem, if it requires further referral for medical assistance or not. The general results from the survey will be communicated to the participants through their in respective ECD centres and forums.

What will happen in the unlikely event of some form injury occurring as a direct result of your child taking part in this research study?

ECD practitioners at various ECD centres are requested to assist in safe guarding the children and assist during the process of measuring height and weight, ensuring children have lighter clothing for weight measure/ don't snatch and wear other children's clothes which may not go down well with other parents. The survey doesn't involve experimentation of harmful medicines / pharmaceutical products or drawing of tissue samples therefore your child is safe to participate whole heartedly.

Will your child be paid to take part in this study and are there any costs involved?

Your child will not be paid to take part in the study.

Is there anything else that you should know or do?

- You should inform your child and the principal that you are granting him/her the permission to taking part in this research study at the ECD.
- You can contact the study supervisor Mrs HEKoornhof at tel. no 021 938 9597 if you have any further queries or encounter any problems.
- You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your Research Coordinator./ Assistant
- You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I …… grant my child the permission to take part in a research study entitled **"**Assessing nutrition knowledge, attitude, behavior and practices (KABP) in early childhood development centres in Zandspruit and Orange Farm, Gauteng Province, SOUTH AFRICA"

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to agree to let my child participate.
- He/ She may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- He/ She asked to leave the study before it has finished, if the study Coordinator or researcher feels it is in my best interests, or if my child does not follow the study plan, as agreed to.

Signed at (*place*) …….. on (*date*) …….. 2015.

…….. ……..

Signature of participant **Signature of witness**

Declaration by investigator

I *(name)* …… declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use a interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*

Signed at (*place*) …….. on (*date*) …….. 2015.

…….. ……..

Signature of investigator **Signature of witness**

Declaration by interpreter

I *(name)* …… declare that:

- I assisted the investigator (*name*) …… to explain the information in this document to (*name of participant*) …….. using the language medium of Afrikaans/English/Sesotho/Venda/Zulu/Ndebele/Sepedi/ Xhosa..

- We encouraged him/ her to ask questions and took adequate time to answer them.
- I conveyed a factually correct version of what was related to me.
- I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) ..... on (*date*) ……..

.....	.....
Signature of interpreter	Signature of witness

ADDENDUM 7: LETTER TO DEPARTMENT OF SOCIAL DEVELOPMENT

P. O. Box 1502
Honeydew
2040

20 June 2016

DEVELOPMENT & RESEARCH SUB-DIRECTORATE

DEPARTMENT OF SOCIAL DEVELOPMENT

THUSANONG BUILDING, 11TH FLOOR

75 COMMISSIONER STREET

JOHANNESBURG

GAUTENG

Dear Sir/ Madam

RE: ASSESSING NUTRITION KNOWLEDGE, ATTITUDE, BEHAVIOR AND PRACTICES (KABP) IN EARLY CHILDHOOD DEVELOPMENT CENTRES IN ZANDSPRUIT AND ORANGE FARM, GAUTENG PROVINCE, SOUTH AFRICA

Permission is being sought to conduct the above mentioned research in collaboration with the University of Stellenbosch as partialfulfilment of my Thesis in Master of Nutrition.

I am student currently enrolled for Masters in Nutrition with University of Stellenbosch. In partial fulfilment of this postgraduate, I have chosen to conduct my research within early childhood development (ECD) sector and this research will enhance nutrition programme implementation, needs assessment and support. It seeks to identify the extent other players are assisting Department of Health and Social Development in managing and curbing malnutrition in ECD centres within Zandspruit and Orange Farm, Gauteng province, promoting quality nutrition and improvement of quality of life for under-fives. Information obtained from this survey will be treated as strictly confidential and will only be shared with the relevant persons within your organization; University of Stellenbosch, Faculty of Health Coordinators and the research team.

Once permission has been granted the team will work closely with Health and Social Development workers within your department responsible for the respective areas mentioned.

The project has been registered as number S15/12/280 at Stellenbosch University and approved by the Ethics committee. For further information kindly refer to attached documents for the Protocol, Ethics approval Letter, questionnaires and itinerary for the survey.

Once if have concluded my research study, I will share my findings with you and I am willing to offer my expertise in making adjustments to improve nutritional care practices in early childhood development centres.

Your usual cooperation is highly appreciated

Yours Faithfully

JAMES MAJAHA

Cell 0719110733 / 074478204

Skype: james.majaha

ADDENDUM 8 Stellenbosch Ethics Committee Approval Letter

Approval Notice

Response to Modifications- (New Application)

08-Jun-2016
Majaha, James J

Ethics Reference #: S15/12/280

Title: Assessing nutrition knowledge, attitude, behaviour and practices (KABP) in early childhood development centres inZandspruit and Orange Farm, Gauteng Province, SOUTH AFRICA

Dear Mr James Majaha,

The **Response to Modifications -** ***(New Application)*** received on **11-Apr-2016**, was reviewed by members of **Health Research Ethics Committee 1** via Expedited review procedures on **08-Jun-2016** and was approved.
Please note the following information about your approved research protocol:

Protocol Approval Period: **08-Jun-2016 -07-Jun-2017**

Please remember to use your **protocol number** (**S15/12/280**) on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired.

The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selectedrandomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United StatesCode of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration ofHelsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western CapeDepartment of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at WesternCape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel:+27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethicsapproval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and documents please visit: www.sun.ac.za/rds
If you have any questions or need further assistance, please contact the HREC office at .
Included Documents:
Curriculum Vitae Koornhof

Investigator Declaration Majaha
Investigator Declaration Tshitaudzi
Curriculum Vitae Tshitaudzi
20160411 MOD Cover letter
Protocol Synopsis
20160411 MOD ProtocolChecklist
Application Forminformed Consent Form Principals and parents
Expedited Review Request
Research Protocol
Curriculum Vitae Majaha
Investigator Declaration Koornhof
Sincerely,
Ashleen Fortuin
HREC Coordinator
Health Research Ethics Committee 1

ADDENDUM 9 Approval Letter from DoSD

GAUTENG PROVINCE
SOCIAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Enquiries: Dr Sello Mokoena
Tel: 011 355 7855
File No: 2/9/39

Dear **JAMES MAJAHA**

RE: APPLICATION TO CONDUCT RESEARCH IN THE DEPARTMENT OF SOCIAL DEVELOPMENT

Thank you for your application to conduct research in the Gauteng Department of Social Development.

Your application on the research **"Assessing nutrition knowledge, attitude, behavior and practices (KABP) in early childhood development centres in Zandspruit and Orange Farm, Gauteng Province, SOUTH AFRICA"** has been considered and approved for support by the Department as it was found beneficial to the Department's vision and mission. The approval is subject to the Departmental terms and conditions as endorsed by you on the 20/06/2016.

May I take this opportunity to wish you well in the journey that you are about to embark upon.

We are looking forward to a value adding research and a fruitful co-operation.

With thanks.

Ms. WR Tshabalala
Head of Department: Social Development
Date: 12/07/2016

ADDENDUM 10: Plausibility Check

Nutrition KABP Orange farm and Zandspruit April 2017.as

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (1.2 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.494)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (4)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**4** (18)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**4** (13)
Standard Dev WHZ . .	Excl Excl	SD SD	<1.1 and >0.9 0	<1.15 and >0.85 5	<1.20 and >0.80 10	>=1.20 or <=0.80 20	**0** (0.96)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (0.18)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**1** (-0.26)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=0.527)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**9** %

The overall score of this survey is 9 %, this is acceptable.

There were no duplicate entries detected.

Missing data:

MONTHS: Line=8/ID=24, Line=9/ID=29, Line=12/ID=28, Line=100/ID=162, Line=102/ID=166, Line=103/ID=165, Line=104/ID=158, Line=105/ID=157, Line=108/ID=160, Line=110/ID=172, Line=112/ID=176, Line=114/ID=168, Line=116/ID=169, Line=117/ID=171, Line=118/ID=170, Line=119/ID=143, Line=120/ID=142, Line=121/ID=144, Line=122/ID=146, Line=124/ID=137, Line=127/ID=141, Line=132/ID=156, Line=135/ID=147, Line=137/ID=151, Line=138/ID=150, Line=141/ID=186, Line=149/ID=180, Line=153/ID=205, Line=157/ID=207, Line=166/ID=242, Line=170/ID=244, Line=171/ID=243, Line=177/ID=237, Line=181/ID=263, Line=187/ID=254, Line=188/ID=253, Line=192/ID=216, Line=194/ID=220, Line=200/ID=214, Line=214/ID=224, Line=252/ID=252, Line=257/ID=257, Line=264/ID=264, Line=268/ID=268, Line=275/ID=275, Line=276/ID=276, Line=285/ID=285, Line=315/ID=315, Line=316/ID=316, Line=329/ID=329,

Line=330/ID=330, Line=338/ID=338, Line=339/ID=339, Line=340/ID=340, Line=341/ID=341, Line=344/ID=344, Line=349/ID=349, Line=350/ID=350, Line=352/ID=352, Line=369/ID=369, Line=371/ID=371, Line=372/ID=372, Line=376/ID=376, Line=379/ID=379, Line=394/ID=394, Line=395/ID=395, Line=396/ID=396, Line=403/ID=403, Line=411/ID=411, Line=420/ID=420

Percentage of children with no exact birthday: 16 %

Age distribution:

Month 6 : #
Month 7 : #
Month 8 : #
Month 9 : ##
Month 10 :
Month 11 : ##
Month 12 : #####
Month 13 : ####
Month 14 : #######
Month 15 : ##
Month 16 : ####
Month 17 : #
Month 18 : ####
Month 19 : ##
Month 20 : ######
Month 21 : ####
Month 22 : #####
Month 23 : ##
Month 24 : ###
Month 25 : #######
Month 26 : ######
Month 27 : ####
Month 28 : ########
Month 29 : #######
Month 30 : ######
Month 31 : #
Month 32 : ######
Month 33 : #######
Month 34 : ####
Month 35 : #######
Month 36 : ########
Month 37 : ########
Month 38 : ####
Month 39 : ########
Month 40 : ##########
Month 41 : ###############
Month 42 : #########
Month 43 : ###############
Month 44 : ##########
Month 45 : ###########
Month 46 : ########

Month 47 : ##########
Month 48 : ########
Month 49 : ############
Month 50 : ##########
Month 51 : ############
Month 52 : ###########
Month 53 : ############
Month 54 : ###
Month 55 : #########
Month 56 : ################
Month 57 : ############
Month 58 : #####
Month 59 : ######
Month 60 : ######

Age ratio of 6-29 months to 30-59 months: 0.34 (The value should be around 0.85).:
p-value = 0.000 (significant difference)

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	15/43.4 (0.3)	17/40.4 (0.4)	32/83.8 (0.4)	0.88
18 to 29	12	34/42.3 (0.8)	25/39.4 (0.6)	59/81.7 (0.7)	1.36
30 to 41	12	39/41.0 (1.0)	45/38.2 (1.2)	84/79.2 (1.1)	0.87
42 to 53	12	71/40.4 (1.8)	57/37.5 (1.5)	128/77.9 (1.6)	1.25
54 to 59	6	28/20.0 (1.4)	30/18.6 (1.6)	58/38.5 (1.5)	0.93
6 to 59	54	187/180.5 (1.0)	174/180.5 (1.0)		1.07

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.494 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)
Overall age distribution for boys: p-value = 0.000 (significant difference)
Overall age distribution for girls: p-value = 0.000 (significant difference)
Overall sex/age distribution: p-value = 0.000 (significant difference)

Digit preference Weight:

Digit .0 : ####################################
Digit .1 : ##
Digit .2 : ##################################
Digit .3 : ##
Digit .4 : ##
Digit .5 : ######################################
Digit .6 : ##
Digit .7 : ##
Digit .8 : ##
Digit .9 : ##

Digit preference score: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.806

Digit preference Height:

Digit .0 : ##
Digit .1 : ####################
Digit .2 : ####################
Digit .3 : ##############
Digit .4 : ################
Digit .5 : ##
Digit .6 : #############
Digit .7 : ###########
Digit .8 : #################
Digit .9 : ################

Digit preference score: **18** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.000 (significant difference)

Digit preference MUAC:

Digit .0 : ##
Digit .1 : #############
Digit .2 : ####################
Digit .3 : ########################
Digit .4 : ##############
Digit .5 : ###################################
Digit .6 : ################
Digit .7 : ######################
Digit .8 : ################
Digit .9 : ##################

Digit preference score: **13** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.000 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)
WHZ			
Standard Deviation SD:	1.02	1.02	0.96
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	0.7%	0.7%	
calculated with current SD:	1.5%	1.5%	
calculated with a SD of 1:	1.3%	1.3%	
HAZ			
Standard Deviation SD:	1.53	1.43	1.09
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	26.9%	26.7%	25.9%
calculated with current SD:	30.1%	29.1%	24.9%
calculated with a SD of 1:	21.3%	21.6%	23.1%
WAZ			
Standard Deviation SD:	1.21	1.17	1.06

(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	8.9%	8.9%	8.0%
calculated with current SD:	11.7%	11.1%	8.9%
calculated with a SD of 1:	7.4%	7.7%	7.7%

Results for Shapiro-Wilk test for normally (Gaussian) distributed data:

WHZ	p= 0.014	p= 0.014	p= 0.193
HAZ	p= 0.000	p= 0.000	p= 0.735
WAZ	p= 0.000	p= 0.028	p= 0.402

(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)

Skewness

WHZ	0.33	0.33	0.18
HAZ	0.84	0.51	0.03
WAZ	0.45	0.08	0.09

If the value is:
-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample
-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.
-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.
-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.
-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	0.49	0.49	-0.26
HAZ	4.93	2.56	-0.29
WAZ	2.56	0.85	0.06

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.
If the absolute value is:
-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.
-between 0.2 and 0.4, the data may be affected with a problem.
-less than an absolute value of 0.2 the distribution can be considered as normal.

Test if cases are randomly distributed or aggregated over the clusters by calculation of the Index of Dispersion (ID) and comparison with the Poisson distribution for:

WHZ < -2: ID=0.93 (p=0.527)
GAM: ID=0.93 (p=0.527)
HAZ < -2: ID=3.80 (p=0.000)
HAZ < -3: ID=1.89 (p=0.022)
WAZ < -2: ID=2.44 (p=0.002)
WAZ < -3: ID=1.00 (p=0.450)

Subjects with SMART flags are excluded from this analysis.

The Index of Dispersion (ID) indicates the degree to which the cases are aggregated into certain clusters (the degree to which there are "pockets"). If the ID is less than 1 and p > 0.95 it indicates that the cases are UNIFORMLY distributed among the clusters. If the p value is between 0.05 and 0.95 the cases appear to be randomly distributed among the clusters, if ID is higher than 1 and p is less than 0.05 the cases are aggregated into certain cluster (there appear to be pockets of cases). If this is the case for Oedema but not for WHZ then aggregation of GAM and SAM cases is likely due to inclusion of oedematous cases in GAM and SAM estimates.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Time	SD for WHZ

```
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.88 (n=15, f=0)  ###
02: 1.01 (n=15, f=0)  #########
03: 1.00 (n=15, f=0)  ########
04: 1.00 (n=15, f=0)  #########
05: 1.58 (n=15, f=2)  ##################################
06: 0.92 (n=15, f=0)  #####
07: 1.21 (n=15, f=0)  ##################
08: 1.12 (n=15, f=0)  #############
09: 1.16 (n=15, f=1)  ###############
10: 0.85 (n=15, f=0)  ##
11: 1.03 (n=15, f=0)  ##########
12: 0.90 (n=15, f=0)  ####
13: 0.93 (n=14, f=0)  #####
14: 0.83 (n=13, f=0)  #
15: 1.08 (n=12, f=0)  ############
16: 0.80 (n=11, f=0)
17: 0.91 (n=09, f=0)  #####
18: 0.42 (n=09, f=0)
19: 0.75 (n=09, f=0)
20: 0.96 (n=09, f=0)  #######
21: 1.17 (n=09, f=0)  #################
22: 1.15 (n=09, f=0)  ################
23: 1.44 (n=09, f=1)  ############################
24: 0.85 (n=08, f=0)  ##
25: 1.14 (n=07, f=0)  ##############
26: 0.63 (n=07, f=0)
27: 1.36 (n=07, f=0)  ########################
28: 0.38 (n=07, f=0)
29: 1.06 (n=06, f=0)  ###########
30: 0.88 (n=06, f=0)  ####
31: 0.73 (n=06, f=0)
32: 0.91 (n=05, f=0)  OOOOO
33: 0.88 (n=04, f=0)  OOOO
34: 0.57 (n=04, f=0)
35: 0.81 (n=04, f=0)  O
36: 1.05 (n=04, f=0)  OOOOOOOOOOO
37: 1.02 (n=04, f=0)  OOOOOOOOO
38: 2.18 (n=04, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
39: 0.56 (n=04, f=0)
40: 0.32 (n=04, f=0)
41: 0.80 (n=03, f=0)
42: 1.03 (n=03, f=0)  OOOOOOOOOO
43: 1.45 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOO
44: 0.14 (n=03, f=0)
45: 1.26 (n=03, f=0)  OOOOOOOOOOOOOOOOOO
46: 0.38 (n=03, f=0)
47: 1.70 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
48: 0.70 (n=03, f=0)
49: 0.69 (n=03, f=0)
50: 0.98 (n=02, f=0)  ~~~~~~~~
51: 0.46 (n=02, f=0)
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)